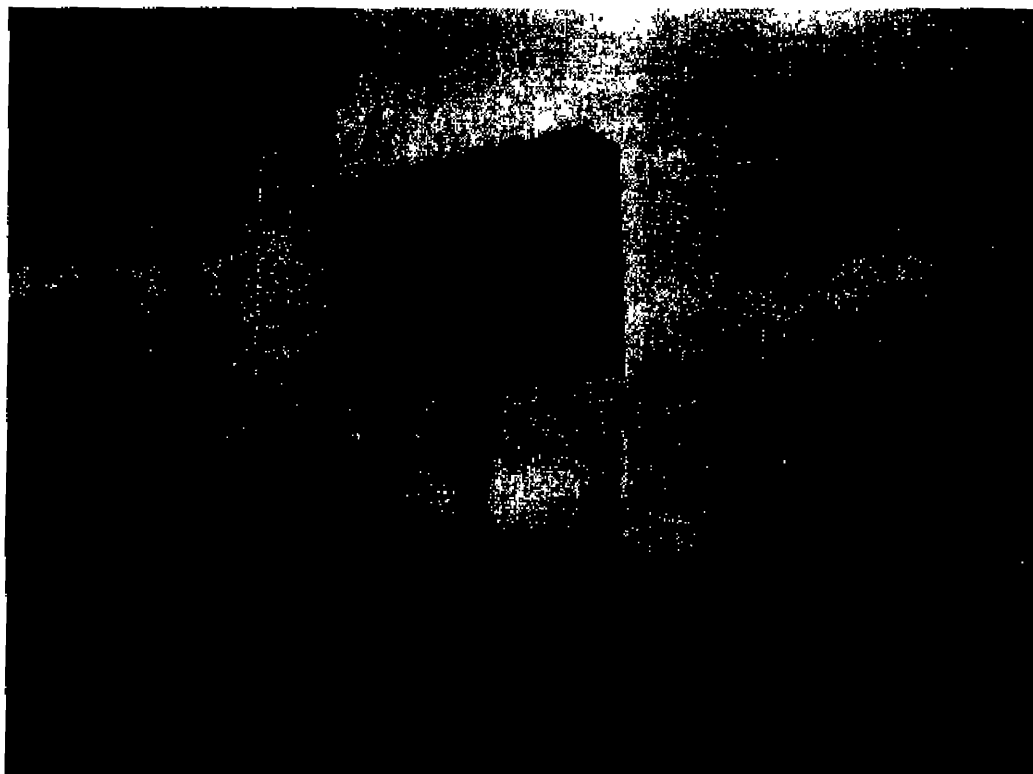




**NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT**

**Superfund Five-Year Review Report
ABC One Hour Cleaners
Jacksonville, Onslow County, North Carolina
EPA ID: NCD 024644494**



**Prepared for the
US Environmental Protection Agency
Region 4**

August 2003

**FIVE-YEAR REVIEW REPORT
ABC ONE HOUR CLEANERS
EPA ID: NCD 024644494**

**Prepared for the
US Environmental Protection Agency
Region 4**

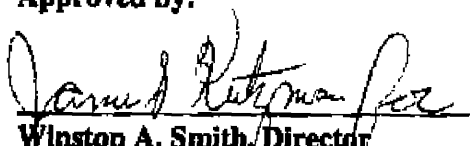


**Prepared by the
State of North Carolina
Department of Environment & Natural Resources**



August 2003

Approved by:


**Winston A. Smith, Director
Waste Management Division**

Date:

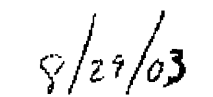

8/29/03

Table of Contents

List of Acronyms.....	iii
Executive Summary.....	v
Five-Year Review Summary Form	vii
1.0 Introduction.....	1
2.0 Site Chronology	2
3.0 Background.....	4
3.1 Site Description.....	4
3.2 Land and Resource Use.....	6
3.3 History of Contamination	6
4.0 Remedial Actions.....	7
4.1 Remedy Selection	7
4.2 Remedy Implementation.....	9
4.3 System Operations/Operation & Maintenance	10
4.4 Progress Since Last Five-Year Review	11
5.0 Five-Year Review Process.....	11
5.1 Administrative.....	11
5.2 Community Involvement	11
5.3 Document Review	11
5.4 ARAR Review	12
5.5 Data Review	13
5.6 Site Inspection	24
5.7 Interviews.....	25
6.0 Technical Assistance	25
6.1 Question A: Is the remedy functioning as intended by the decision documents?.....	25
6.2 Question B: Are the exposure assumptions, toxicity data, clean-up levels and remedial action objectives (RAOs) used at the time of the remedy still valid?.....	26
6.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	27
6.4 Technical Assessment Summary	27
7.0 Issues	27
8.0 Recommendations & Follow-up Actions	28
9.0 Protectiveness Statement	29
10.0 Next Review	29

Tables

Table 1: Chronology of Site Events	2
Table 2: Groundwater Clean-up Goals as Specified in the ROD	8
Table 3: Soil clean-up Goals as Specified In the ROD	8
Table 4: Surficial Aquifer Groundwater Results - OU1 and OU 2 RI.....	15
Table 5: Castle Hayne Aquifer Groundwater Results- OU1 and OU 2 RI.....	16
Table 6: Summary of the VOC Groundwater Analytical Results -2002/2003 Surficial Aquifer	17
Table 7: Summary of the VOC Groundwater Analytical Results -2002/2004 Castle Hayne Aquifer.....	18
Table 8: Summary of the Soil Sampling Analytical Results from May 1994 RI.....	22
Table 9: Summary of the Soil Sampling Analytical Results from 2/2001 and 1/2002	22
Table 10: Recommendations and Follow-up Actions	28

Figures

Figure 1: Site Vicinity Map5
Figure 2: Site Map with Groundwater Wells Depleted 19
Figure 3: Remedial Investigation Sampling Locations, 21
Figure 4: Sampling Locations from the 2/2001 and 1/2002 Sampling Event 23

Attachments

Attachment 1: List of Documents Reviewed
Attachment 2: Site Inspection Check List
Attachment 3: Photographs of the Site
Attachment 4: Community Interviews

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
BGS	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
CFR	Code of Federal Regulations
CWA	Clean Water Act
DCE	Dichloroethene
EPA	United States Environmental Protection Agency
FS	Feasibility Study
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCAC	North Carolina Administrative Code
NC DENR	North Carolina Department of Environment and Natural Resources
NCSWCS	North Carolina Surface Water Quality Standards
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCD	Natural Resources Community Development
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethene
PCOR	Preliminary Close-Out Report
PRP	Potentially Responsible Party
PSD	Performing Settling Defendant
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study

ROD	Record of Decision
RPM	Remedial Project Manager
EDWA	Safe Drinking Water Act
SPM	Soil Pressure Monitoring
SOW	Statement of Work
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TSS	Total Suspended Solids
USMC	United States Marine Corp
VOC	Volatile Organic Compound
WiRO	Wilmington Regional Office

Executive Summary

The ABC One-Hour Cleaners site is located at 2127 Lejeune Boulevard, Jacksonville, Onslow County, North Carolina, and encompasses an area of approximately 1 acre. From 1964 to 1985, ABC Cleaners disposed of spent solvents and “still bottoms” (powder residue), as well as, possible septic tank leakage with high concentrations of spent solvents on the property in unlined, un-contained media. In 1984, as part of a routine water quality evaluation, the Department of the Navy collected groundwater samples and determined that dichloroethene (DCE), trichloroethene (TCE), and tetrachloroethene (PCE) were present in 10 of the 40 wells sampled. Two of these wells were located within the Tarawa Terrace well field in the vicinity of the ABC Cleaners. In 1988, the Wilmington Regional Office (WiRO) of the Division of Environmental Management, North Carolina Department of Natural Resources and Community Development (NRCD) conducted a groundwater pollution study to define the source of PCE in wells within the Tarawa Terrace well field. The study concluded that the most likely source of groundwater contamination was ABC One-Hour Cleaners.

The remedial actions in the Record of Decisions (RODs) dated January 28, 1993 for OU 1, provided remediation of contaminated groundwater, and the second ROD dated September 6, 1994 for OU 2, provided remediation of contaminated soils. As stated in the RODs, contaminated groundwater will be extracted from the Surficial and the Castle Hayne aquifers using extraction wells the extracted groundwater will be treated by air stripping and an off-gas treatment system. Surface water discharge of the treated groundwater will be to Northeast Creek via a National Pollutant Discharge Elimination Systems (NPDES). Contaminated soils will be remediated using Soil Vapor Extraction (SVE), Institutional controls will be implemented for both operable units.

This is the first five-year review for the ABC One-Hour Cleaner Site. The triggering action for this statutory review is the release of funds for the beginning of the soil remedial action on August 31, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. There are several issues/problems that have been identified during this review. The most significant of these being:

1. Institutional controls as proposed in the RODs have not been implemented.
2. At this time, groundwater contamination in the surficial and Castle Hayne aquifers may not be contained. It is not clear that the zone of influence of the recovery wells is capturing downgradient contamination.
3. The extent of contamination needs to be investigated in the Castle Hayne aquifer.

4. It is now technically possible to obtain lower quantitation limits in water samples for two site specific compounds, PCE and vinyl chloride. Therefore, clear-up goals of 0.7 ug/l for PCE and 0.5 ug/l for vinyl chloride should be changed to reflect these new values.

Other minor issues that need to be addressed, include leaks in and/or around the groundwater treatment building, housekeeping Issues and improvement of the aesthetics of the area surrounding the groundwater treatment building, and soil monitoring needs to be more routine.

The remedies at OU1 and OU 2 currently protect human health and the environment in the short-term because the main source of contamination is being remediated through the soil vapor extraction system and currently no human exposure pathways exist to contaminated soil or groundwater. However, in order for the remedies to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness Implementation of Institutional Controls as stated in the RODs; A formal review should be conducted for optimizing the remedial systems for groundwater; and Further groundwater investigation of the Castle Hayne Aquifer.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): ABC One Hour Cleaners		
EPA ID (from WasteLAN): NCD 0246444494		
Region: 4	State: NC	City/County: Jacksonville/Onslow
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other(specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple Ous? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: 8 / 9 / 2000	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other		
Author(s) name: Nile Testerman/Stephanie Grubbs		
Author(s) title: Engineer/Hydrogeologist	Author(s) affiliation: NC DENR	
Review period: 4/ 1 / 2003 to 8 / 31 / 2003		
Date(s) of site inspection: 5 / 5 / 2003		
Type of review: Statutory		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU #_____ <input type="checkbox"/> Actual RA Start at OU #_____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input checked="" type="checkbox"/> Other (specify) Release of the funds for the soil remediation action		
Triggering action date (from WasteLAN): 8 / 31 / 1988		
Due date (five years after triggering action date): 8 / 31 / 12003		

Five-Year Review Summary Form, cont'd

Issues:

1. Institutional controls as proposed in the RODs have not been implemented.
2. Groundwater contamination in the surficial and Castle Hayne aquifers may not be contained. It is not clear that the zone of influence of the recovery wells is capturing downgradient contamination.
3. The extent of contamination needs to be investigated in the Castle Hayne aquifer.
4. It is now technically possible to obtain lower quantitation limits in water samples for two site specific compounds, PCE and vinyl chloride. Therefore, clean-up goals of 0.7 ug/l for PCE and 0.5 ug/l for vinyl chloride should be changed to reflect these new values.

Recommendations and Follow-up Actions:

Major recommendations involve: Implement institutional controls, conduct formal review for optimizing the groundwater remedial system, investigate further the Castle Hayne Aquifer, and modify groundwater clean-up goals. Other minor issues include housekeeping issues and improve the general appearance of the groundwater treatment plant area, leaking and plumbing in the groundwater treatment building, and more routine soil monitoring.

Protectiveness Statement:

The remedies at OU1 and OU 2 currently protect human health and the environment In the short-term because the main source of contamination is being remediated through the soil vapor extraction system and currently no human exposure pathways exist to contaminated soil or groundwater, However, In order for the remedies to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness: Implementation of Institutional Controls as stated in the RODs; A formal review should be conducted for optimizing the remedial systems for groundwater, and Further groundwater Investigation of the Castle Hayne Aquifer.

1.0 Introduction

The purpose of conducting a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The North Carolina Department of Environment and Natural Resources (NC DENR) is preparing this Five-Year Review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review the required, the results of all such reviews, and any actions taken as a result of such reviews.

The United States Environmental Protection Agency (US EPA) interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the first five-year review for the ABC One-Hour Cleaner Site (ABC Cleaners). The triggering action for this statutory review is the release of funds for the beginning of the soil remedial action on August 31, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. This Five Year Review was performed in a manner consistent with the latest US EPA Comprehensive Five-Year Review Guidance (USEPA, 2001).

2.0. Site Chronology

Table 1 lists the site chronology for selected events for the ABC Cleaners site.

Table 1 - Chronology of Site Events

Event	Date
ABC Cleaners disposed of spent solvents and “still bottoms” (powder residue), as well as, possible septic tank leakage with high concentrations of spent solvents on the property in unlined, un-contained media.	1958 to 1985
Routine water quality evaluation by the US Navy discovered DCE, TCE, and PCE in community wells at Tarawa Terrace.	July 1984
Wilmington Regional Office (WRO) of the Division of Environmental Management, notified by USMC that the Tarawa Terrace were contaminated by off-site sources.	April 1985
WRO conducted a groundwater pollution study to define source within the Tarawa Terrace well field. Which concluded that the source was from the ABC One-Hour Cleaners.	April – September 1985
Preliminary Assessment report completed by the North Carolina Department of Health Services CERCLA Unit	September 11, 1986
Site inspection completed by the North Carolina Department of Health Services CERCLA Unit	May 27, 1987
Site proposed to the National Priorities List (NPL)	June 24, 1988
Site finalized for the NPL	March 31, 1989
Remedial investigation and Feasibility study (RI/FS) complete for Operable Unit 1 (OU1, groundwater contamination)	November 5, 1992
The Acting Regional Administrator signed the Record Of Decision (ROD) documenting the Remedial Action (RA) for OU 1	January 26, 1993
FS complete for Operable Unit 2 (OU 2, soil contamination)	March 18, 1994
RI complete for OU 2	May 13, 1994
The second ROD was signed documenting the RA for OU 2	September 8, 1994
National Pollutant Discharge Elimination System (NPDES) permit issued by NC DENR for treated groundwater	June 1995
Right of Way requested for a groundwater remediation system pipe to be installed under Southern Norfolk Railroad	February 1997 to August 1998
Bid process complete and Foster Wheeler Environmental Corporation is awarded the RA subcontract for OU 1	June 7, 1997
Right of Way signed for access to install pipe beneath railroad	August 10, 1998

Release of funds for the remedial action for OU 2 (trigger for start of 5 year review)	August 31, 1998
Foster Wheeler starts-up the groundwater system and completes the performance demonstration	January 1999- November 1999
Bid process complete and McLaren-Hart is awarded subcontract for OU 2	July 30, 1999
Foster Wheeler and Weston (EPA contractor) have conflicts regarding violations With NPDES permit due to increased nickel concentrations and total suspended solids (TSS), flow rate issues, delays in start of remediation system, and iron fouling the system.	Late 1999
GW remediation system basically shut-down due to high concentrations of nickel And total suspended solids (TSS) in effluent.	February 2000 to March 2002
Construction complete for OU 1	February 2000
Soil Vapor Extraction (SVE) system for OU 2 started operating by McLaren-Hart.	April 2000
Foster Wheeler filed a lawsuit against Weston citing breach of contract, declaratory judgement that the subcontract expired, declaring judgement that Foster Wheeler was not in default, and breach of the Duty of Good Faith and Fair Dealings	August 4, 2000
Construction complete for OU 2	August 9, 2000
SVE system is fully operational and meets Statement of Work (SOW) requirements.	August 28, 2000
McLaren-Hart is purchased by J.A. Jones. A newly-formed McLaren-Hart/Jones Company is established as a subsidiary of J.A. Jones Environmental Services.	October 2000
NPDES permit changed from Foster Wheeler to Weston as owner of the system.	May 31, 2001
Modified NPDES permit which reflects dilution calculated in Cormix Mixing Analysis and discharge into Northeast Creek.	October 1, 2001
GW system started again by Weston.	March 20, 2002
Superfund Preliminary Close-Out Report (PCOR) complete.	August 8, 2002
GW system off and on sporadically due to minor problems and repairs.	October 2002- March 2003
GW system restarted b Terraine (Weston subcontractor) and is full operational.	March 15, 2003

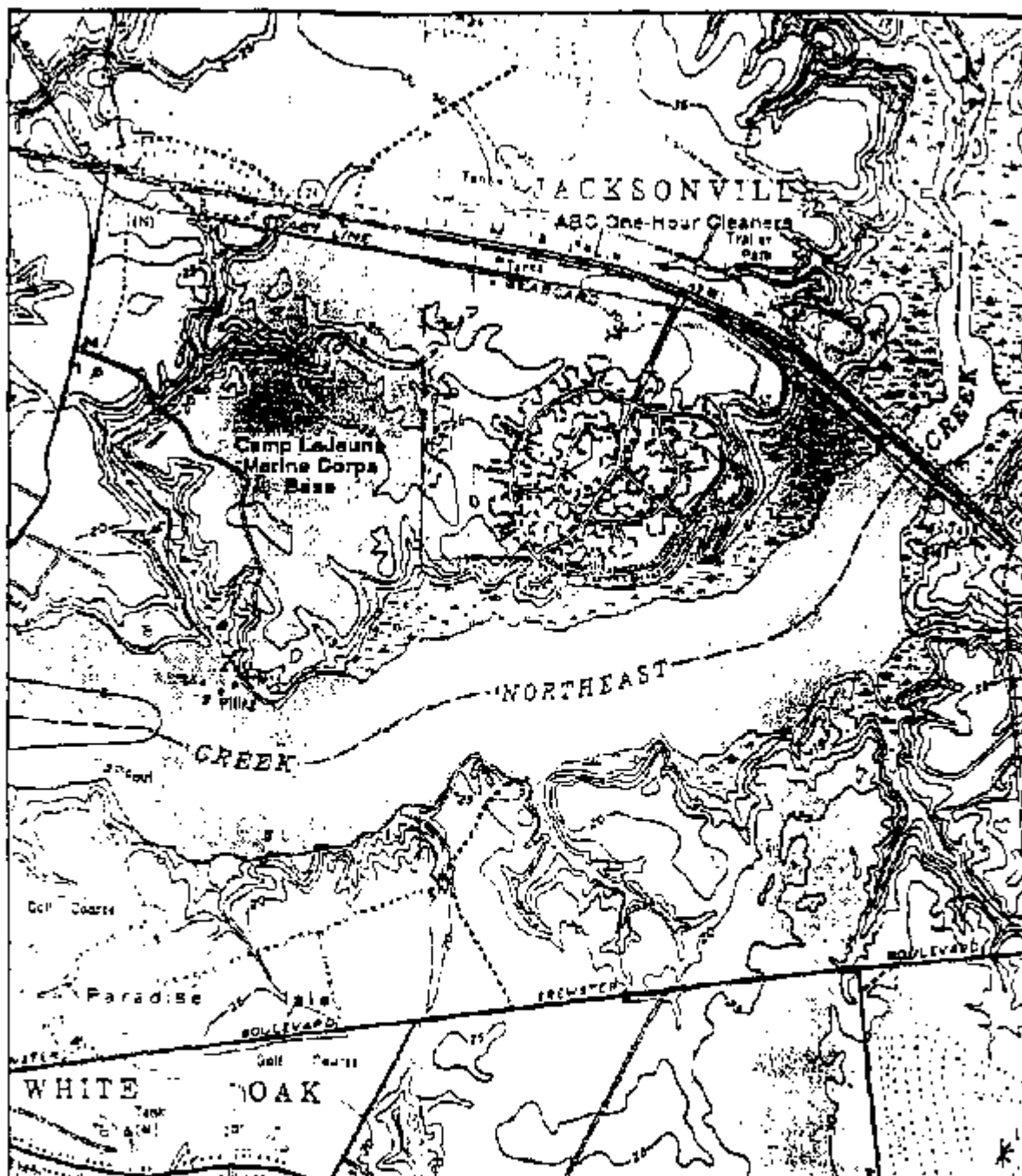
3.0 Background

3.1 Site Description

The ABC One-Hour Cleaners site is located at 2127 Lejeune Boulevard, Jacksonville, Onslow County, North Carolina, and encompasses an area of approximately 1 acre. The area surrounding the site is a business district of Jacksonville and north of the Camp Lejeune Marine Corps Base (Base). The dry cleaning establishment, consisting of three buildings joined to form one complex, is located on the southern portion of the property. The back portion of the property is overgrown with vegetation and is surrounded by a chain-link fence. A small parking lot fronts Lejeune Boulevard and driveways exist on the east and west of the complex. Across Lejeune Boulevard to the south and southeast are the Norfolk Southern Railroad tracks, the Base, and the Tarawa Terrace Housing Development. The Tarawa Terrace complex serves as housing for non-commissioned officers of the Base and their families.

The Site is situated at an elevation of about 30 feet above mean sea level (msl). Surface water run-off flows overland into ditches and culverts that are directed across Lejeune Boulevard (Highway 24) onto Base property and, along with run-off from the Base, into Northeast Creek. Approximately 4,400 feet southeast of the Site, Northeast Creek flows in a southwesterly direction to the New River, which drains into the Atlantic Ocean (USEPA, 2002; USEPA, 1994). Elevations decline gradually toward the south and southeast, toward Northeast Creek. Figure 1 is a site vicinity map showing the site, the Base, and Northeast Creek.

The soils at the Site have been classified within the Onslow fine sandy soil association. Underlying the surface soils (approximately 5- to 7-inches thick) is a 6- to 8-inch thick hardpan layer. This hardpan is composed of fine sand cemented with organic matter and iron, and may locally inhibit the downward movement of recharge. Shallow subsurface geology specific to the site was determined to include 2 aquifers. The surficial aquifer is primarily saturated quartz sands which extends to a depth of 70-feet Below Ground Surface (BGS). Overlying the saturated sand is a zone composed of interbedded sands, silts, and clays which extend from the ground surface to approximately 25 feet BGS. Underlying the surficial aquifer is the Castle Hayne which is primarily composed of saturated fossiliferous sand and gravel with variable silt content. A noncontiguous confining unit has been located separating the surficial and Castle Hayne aquifers.

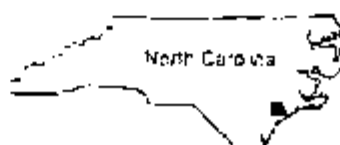


Source U.S.G.S. Map Jacksonville South, N.C.
 Quadrangle 1928

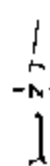
96P-3982 12/2/96

0 1000 2000 3000 4000

Scale in Feet



Quadrangle Location



3.2 Land and Resource Use

ABC Cleaners is currently operating at the facility. The general land use within in the area is general retail and commercial business properties. To the north of the Site are residential areas. Land located to the south serves as housing for the Base and undeveloped woodland areas. Since February 1985, Tarawa Terrace is supplied water by the Camp Lejeune Holcomb Boulevard drinking water system.

3.3 History of Contamination

ABC Cleaners is a North Carolina corporation registered with the Secretary of State as of March 4, 1958. Martha Melts and Milton Melts purchased the property on which the ABC Cleaners facility is located on September 16, 1964. From 1964 to 1985, ABC Cleaners disposed of spent solvents and “still bottoms” (powder residue) on the property in unlined, un-contained media. It is estimated that approximately one ton of still bottoms were placed on the driveway over a 30-year operating period.

A septic tank soil absorption system was located in the rear of the building complex. The septic system consisted of an underground concrete tank with a concrete lid and a pipe of unknown length that discharged into the subsurface soil. The septic system was located within 4 feet of the PCE storage tank. The age of the septic system reportedly dates back to the original construction of the building in the 1940's. ABC Cleaners began occupying the building in 1955. In the 1960s, ABC Cleaners installed a floor drain to the septic tank and tied its wastewater discharge, except for its lavatories, into the Weyerhaeuser Properties' water and sewer system. The lavatories remained tied into the septic system until approximately 1985, at which time they were also tied into the Weyerhaeuser Properties' system.

In July 1984, as part of a routine water quality evaluation, the Department of the Navy collected groundwater samples from 40 of the 100 community water supply wells located on the Base. The Navy determined that dichloroethene (DCE), trichloroethene (TCE), and tetrachloroethene (PCE) were present in 10 of the wells sampled. Two of these wells were located within the Tarawa Terrace well field in the vicinity of the ABC Cleaners.

In April 1985, the Wilmington Regional Office (WiRO) of the Division of Environmental Management, North Carolina Department of Natural Resources and Community Development (NRCD) was notified by the United States Marine Corps (USMC), that two deep-water wells in the Tarawa Terrace housing area at the Base were contaminated by what appeared to be off-site sources. From April through September 1985, WiRO staff conducted a groundwater pollution study to define the source of PCE in wells within the Tarawa Terrace well field. The study concluded that the most likely source of groundwater contamination was ABC One-Hour Cleaners.

In data collected in February 1985, the two Tarawa Terrace wells contained maximum concentrations of PCE at 1,580 ppb, TCE at 57 ppb, DCE at 92 ppb and vinyl chloride at 27 ppb. On February 8, 1985 the wells are shut down. All contaminated wells in Tarawa Terrace are now offline,

The soil contamination on site was a result of disposing spent solvents and “still bottoms” (powder residue), as well as, possible leaks from the septic tank system onto unlined, un-contained media. Based on data collected in a 1986 investigation, maximum concentrations of contaminants within soils on site were 860 mg/kg (ppm) PCE, 24 mg/kg TCE, and non-detect for 1,2-DCE, 1,1-DCE, and vinyl chloride. However, data collected during the RI found levels of 1,2-DCE and vinyl chloride at mean concentrations of 5.0 mg/kg and 0.135 mg/kg, respectively. A septic tank sample, also collected during the RI, indicated that the concentrations of PCE was estimated to be approximately 230,000 µg/L, representing a significant contaminant source,

4.0 Remedial Actions

4.1 Remedy Selection

The remedial actions in the Record of Decisions (RODs) dated January 28, 1993 for OU 1, provided remediation of contaminated groundwater, and the second ROD dated September 6, 1994 for OU 2, provided remediation of contaminated soils. The description of the selected remedies in the RODs include:

Groundwater

- Contaminated groundwater above ARARs will be extracted from the Surficial and the Castle Hayne aquifers using extraction wells;
- The extracted groundwater will be treated by air stripping and an off-gas treatment system (if needed);
- Surface water discharge of the treated groundwater will be to Northeast Creek via a National Pollutant Discharge Elimination Systems (NPDES);
- Periodic monitoring will be conducted to assess the effectiveness of the remedy for a period of up to 30 years; and
- Institutional controls will be placed on well construction and water use in the general area of the site.

Table 2: For OU I - Groundwater, the ROD specified the following clean-up goals:

CONTAMINANT	CLEAN-UP LEVEL (ug/l)
tetrachloroethene	1
trichloroethene	2.8
1,2-dichloroethene	70
vinyl chloride	1

Soils

- Remediation of contaminated soils using Soil Vapor Extraction (SVE); and
- Implementation of institutional controls.

Table 3: For OU2 - Soils, the ROD specified the following clean-up goals:

CONTAMINANT	CLEAN-UP LEVEL (mg/kg)
tetrachloroethene	2.16
trichloroethene	0.90
1,2-dichloroethene	21.0
vinyl chloride	0.03

The remedies were selected to protect human health and the environment, comply with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and be cost effective. The primary goal of the remedy was to minimize the migration of contaminants from the property that could degrade groundwater quality and prevent further migration of groundwater contamination beyond its current extent. These remedies utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduce the toxicity, mobility, and/or volume as a principal element.

Because these remedies may result in hazardous substances remaining on site above ARARs for more than five years, Five-Year Reviews will be completed to assess site conditions, contaminant distributions, and any other associated site hazards.

4-2 Remedy Implementation

OU 1-Groundwater

The Acting Regional Administrator signed the Record Of Decision (ROD) documenting the Remedial Action (RA) for OU 1 (groundwater contamination) on January 26, 1993. Based on the November 4, 1997 Work Plan for the Groundwater Remediation, Foster Wheeler Environmental Corporation designed the groundwater extraction and treatment system. The system selected for the site consists of extraction wells and a low profile air stripper. The objectives of the groundwater treatment system was designed to reduce the contaminants of concern (COC) and to meet the NPDES permit requirements for discharge into Northeast Creek. The current treatment system consists of two pumps, a series of bag filters, and an air stripper (tray aeration system).

During February 1997, a Right of Way access was requested for a groundwater remediation system pipe to be installed under Norfolk Southern Railroad. Access was not granted until August 1998. From January 1999 to November 1999, Foster Wheeler completes the performance demonstration of the groundwater system. Data collected revealed that the original four recovery wells were unable to achieve the required pumping rate. Because the wells only extended partially into the surficial aquifer, four additional wells were extended the entire length of the aquifer. These wells did not provide sufficient flow rates, due to lack of proper well development, so the wells were pumped at a lower flow rate. It was verified that the capture zone included the entire known area of contamination. Since start-up of the system, nickel removal filters were not removing enough nickel to comply with the NPDES permit requirements. Other system problems include iron fouling the filtration media and the total suspended solids periodically exceeding the discharge limit. After several months of testing, Foster Wheeler abandoned operations and Weston took over the start-up of the system. As of October 1, 2001, a new NPDES permit was obtained which reflected Weston as the owner of the system and new dilution calculations based on the CORMIX Mixing Analysis. Based on this analysis, a discharge pipe was extended to discharge into Northeast Creek. On March 20, 2002 the groundwater remediation system was started-up by Weston. On July 25, 2002 EPA and NC DENR conducted a final inspection and determined that the contractors have constructed the remedy in accordance with the remedial design (RD) plans and specifications. By March 2003, the system is fully operation under the supervision of Terraine (Weston's subcontractor).

OU 2-Soil

The release of funds for the remedial action for OU 2 was August 31, 1998, also the trigger for start of 5-year review process. On January 18, 2000 McLaren/Hart, Inc. completed the Work Plan for the Soil Remediation at the ABC Cleaners site. The objectives of the plan were to properly dispose of the contents of the septic tank and seal

the opening with a concrete cap; install SVE extraction wells to remove soil vapor from unsaturated zone and to maintain a negative subsurface pressure of (at a minimum of) 0.5 inches of water at all soil pressure monitoring (SPM) probes; verify that samples collected at five locations be less than the soil remediation goals after a maximum of 2 years from the date of the contract award; SVE system shall operate until remediation goals are achieved; and the system may discharge a maximum of 1.1 pounds (lbs.) of VOC per hour and 1.05 lbs. of PCE per hour without an air emission control device. On August 28, 2000 the SVE system operated by McLaren-Hart is fully operational and meets Statement of Work (SOW) requirements. Prior to August 2000, some extraction wells and SPM probes were malfunctioning. Currently all wells and probes are functional and the system has been fully operational since. Based on data collected in October 2002, the VOC removal rate is approximately 1.8 lbs. per week compared to the 50 lbs. per week in late 2000. The mass recovery rate has slowed as the contaminant levels in the soil decrease.

4.3 System Operation/Operation and Maintenance

The primary activities associated with O&M include:

- Inspection of the conditions of the soil vapor extraction wells and the groundwater monitoring and recovery wells. As well as inspections of both the groundwater and soil remediation systems.
- Weekly inspection or replacement of bag filters due to iron build-up in the groundwater monitoring system. Weekly inspection and periodic cleaning of the air stripper trays,
- Weekly Inspection of air flow and vacuum gages for the SVE system.
- Environmental monitoring including semi-annual monitoring of groundwater and bimonthly NPDES compliance sampling and quarterly acute toxicity test sampling. Soil monitoring includes monthly air emissions sampling for each COC. Soil sampling will occur to verify if remediation goals have been met once air emission monitoring indicates CCC are not detected.

The original cost estimate to implement the OU1 groundwater remedial action, as described in the ROD, was \$2,262,900. More detailed cost estimate documentation can be found in the feasibility Study for OU1. The bid price for the project submitted by the RA-subcontractor was \$732,781. After EPA's subcontractor took over the project and made modifications, an additional \$60,000 were spend on construction costs. To date the total construction cost for OU1 is \$792,751. Based on the Interim Remedial Action Report dated May 2002, the groundwater remediation system is expected to operate for approximately 30 years.

The original cost estimate to implement the remedial action described in the ROD for OU2 soil was \$ 521,463. The original bid submitted by the RA-Subcontractor was \$156,550. The cost of the optimization activities performed to the SVE system was \$4,500. To date the total construction costs for OU2 is \$161,050.

4.4 Progress Since Last Five Year Review

Since this is the first Five-Year Review Report, no other report is available.

5.0 Five-Year Review Process

5.1 Administrative Components

The five-year review process for the ABC One-Hour Cleaners site was performed by the NC DENR, Superfund Section. Nile Testerman (Environmental Engineer) and Stephanie Grubbs (Hydrogeologist) from NC DENR were responsible for gathering and reviewing data for this review. Telephone or email discussion/interviews with Luis Flores, EPA Remedial Project Manager (RPM), and Brian McGee, Project Manager for Weston, were conducted. Other activities conducted for this review include document review, site inspections/site meeting with Terraine and J. A. Jones on May 5, 2003, community involvement interviews (conducted by Diane Barrett, USEPA), and the Five-Year Report preparation.

5.2 Community involvement

Telephone interviews for the 5-year review of remedial activities for the ABC One-Hour Cleaner were conducted by Diane Barrett, EPA Community Involvement Coordinator between May 30 and June 20, 2003. Copy of the telephone interview notes are included in Attachment 4.

5.3 Document Review

This five-year review consisted of a review of relevant documents including the Signed RODs for both operable units, RI reports for OU1 and OU2, Interim Remedial Action Reports, and the Preliminary Close-Out Report (PCOR). Applicable groundwater and soil clean-up standards and other ARARs, as listed in the RODs, were also reviewed and checked for updates. See Attachments for a complete list of documents reviewed.

5.4 ARAR Review

In performing the five-year review for compliance with applicable or relevant and appropriate requirements (ARARs), only those ARARs addressing risk posed to human health and the environment (ie: addressing the protectiveness of the remedy) were reviewed. This is in keeping with current US EPA guidance on five-year reviews:

Federal ARARs

- 40 CFR Parts 261, 262, 263, 264, and 268 promulgated under the authority of the Resource Conservation and Recovery Act (RCRA)
- Clean Water Act Water Quality Criteria (CWA Part 303, 40 CFR Part 131)
- Safe Drinking Water Act (SDWA) National Primary Drinking Water Standards (40 CFR Part 141)
- SDWA National Secondary Drinking Water Standards (40 CFR Part 143)
- SDWA Maximum Contaminant Levels Goals (40 CFR Part 141)
- CWA National Pollutant Discharge Elimination System (NPDES) Requirements (CWA Part 402; 40 CFR Part 125)
- CWA National Pretreatment Standard for Indirect Discharge to a POTW (CWA Part 307(b); 40 CFR Part 403)
- CWA Technology-Based Effluent Limitations (CWA Part 301(b))
- Solid Waste Disposal Act (40 USC §6901-6987; 40 CFR Part 261)

State ARARs

- Regulations for the Management of Hazardous Waste promulgated under the authority of the NC Waste Management Act (North Carolina Administrative Code (NCAC) Title 15A, Chapter 13A)
- Regulations for the disposal of Solid Waste promulgated under the authority of the NC Hazardous Waste Commission Act (NCAC Title 15A, Chapter 13B)
- NC Drinking Water and Groundwater Standards; Groundwater Classifications and Standards (NCAC Title 15 Chapter 2L)
- NC Surface Water Quality Standards (NCSWQS) Classification and Water Quality Standards (NCAC Title 15 A Chapter 2B)
- NCSWQS Technology-Based Effluent Limitations (NCAC Title 15A Chapter 2, Subchapter 2B.0400)
- NC Drinking Water Act (NCDWA) (General Statutes Chapter 130A, Article 10)
- NC Water Pollution Control Regulations (NCWPCR) (NCAC Title 15 Chapter 2, Subchapter 2H)
- NCWPCR Wastewater Treatment Requirements (NCAC Title 15 Chapter 2, Subchapter 2H.0100)

Analytical capabilities have changed since the ROD for OU1 was prepared. Most significantly, quantitation limits in most cases are lower than the ROD clean-up levels. It is now technically possible to obtain lower quantitation limits in water samples for two site specific compounds, PCE and vinyl chloride. At the time of the ROD, the quantitation limits for PCE and vinyl chloride were 1 ug/l. This limit of 1 ug/l was then specified in the ROD as the clean-up goals in groundwater for PCE and vinyl chloride. Currently, the quantitation limits for PCE and vinyl chloride are 0.5 ug/l. The NC Groundwater Standard, as stated in the NC Drinking Water and Groundwater Standards; Groundwater Classifications and Standards (NCAC Title 15 Chapter 2L), is 0.7 ug/l for PCE and 0.015 ug/l for vinyl chloride. Therefore, clean-up goals of 0.7 ug/l for PCE and 0.5 ug/l for vinyl chloride would be decreased to these new values.

At the time the ROD for OU 2 was prepared, a baseline risk assessment was conducted. The soil clean-up goals as stated in the ROD are still applicable.

5.5 Data Review

Groundwater

The data review for the groundwater monitoring consisted of evaluation of pre-remedial data from April 1992 and September 1993 and data collected after the start-up of the remediation system dated May 2002 to March 2003. The data from March 2003 is the most current data available. The main resources for this data is the *Draft Performance Remedial Design, Operable Unit 1* dated July 7, 1994, *ABC One-Hour Cleaners Groundwater Sampling Results -November 2002* dated February 3, 2003, and the most current data from Weston dated July 2003 (the most current data was provided via email from Weston since a final report was not available).

Groundwater sampling data was reviewed for sampling events occurring in April 1992, September 1993, May 2002, August 2002, November 2002, and March 2003. Gaps in the data from 1993 to 2002 are due to the extensive problems including obtaining railroad access agreements, exceeding NPDES permit requirements, and contractor disputes. Table 4 presents all the pre-remedial action sampling data from 1992 and 1993 for the surficial aquifer. Table 5 presents all the pre-remedial action sampling data from 1992 and 1993 for the Castle Hayne aquifer. Data from the most current sampling events May 2002, August 2002, November 2002, and March 2003 are represented in Table 6 from the surficial aquifer and Table 7 from the Castle Hayne aquifer. Figure 2 is a site map with all the monitoring wells locations.

Based on the data from the 2002 sampling events, Weston concluded that the VOC concentrations increased significantly in RWS-4A and decreased significantly in well C-13. VOC concentrations on S-2, on ABC property, decreased more than five-fold between May and November 2002. VOC concentrations in well RWC-1 decreased in December 2002, even though there was an increase between May and August. The remaining wells have been fairly consistent and many show a slight downward trend. The VOC plume appears

to be elongating to the east-southeast in both aquifers and migration has proceeded further into the Castle Hayne. The highest VOC concentrations (greater than 1,000 µg/l) were found in two recovery wells (RWS-4A and RWC-2), indicating the well are placed appropriately for extraction of contaminated groundwater. However, contamination in the Castle Hayne is not being recovered and treated since it is located beyond the capture zone of RWC-2. The presence of cis-1,2-DCE and vinyl chloride indicates that the PCE and TCE are degrading in the aquifers. The PCE and TCE concentrations are still higher than the daughter compounds.

Soil

The data review for soil monitoring consisted of evaluation of pre-remedial data from the Remedial investigation dated May 1994 and data collected from the most current sampling events dated February 9-14, 2001 and January 29, 2002. On July 15, 2002, several upgrades to the SVE system were implemented. The primary system modifications were to connect two additional extraction vents and one pressure probe in the vicinity of the former septic tank pit. The data from the February 2001 and January 2002 sampling events are the most current and complete data sets available. This information was submitted to the US EPA via Technical Memo from Weston,

Table 8 presents all the pre-remedial data from the RI report. Figure 3 shows all the sampling location from the RI sampling event. Table 9 presents data from the sampling events in 2001, 2002, and various other historical sampling data. Figure 4 is a site map with all the soil sampling locations for the 2001 and 2002 sampling events. In February 2001, all 12 samples collected exceeded the PCE clean-up goal. In the January 2002 sampling event, only four samples exceeded the PCE clean-up goal. These results indicate that the SVE system continues to reduce the overall mass of VOCs in the soil. The SVE system has been operational since April 2000 and has, as of August 2002, recovered approximately 700 lbs of volatile organic compounds. Three of the four samples that were exceeding the goal were beneath the building and at depths at or greater than 10 feet. The results indicate that the bulk of the PCE contamination remains beneath the floor of the room that contained the septic tank pit. These soil sampling results are supported by the air monitoring results which indicate that the VOC concentration in the soil vapor extracted from a vent adjacent to the septic tank pit area (vent T-2) is three times greater than from any other vent.

Table 4: Surficial Aquifer Groundwater Results OU 1 (4/92) and OU 2 (9/93) Remedial Investigations											
Well	Date	Benzene	chloro- benzene	chloro- form	1,1-dichloro- ethane	1,2-DCE (total)	PCE	1,1,2- trichloro ethane	TCE	vinyl chloride	xylene
S1	Apr-92	<10	<10	<10	<10	<10	10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	0.2J	27	<1	0.6J	<1	<1
S2	Apr-92	<10	<10	1J	5J	1,200	650	<10	690	100	<10
	Sep-92	0.4J	0.6J	<1	1	466	490	<1	280	70	3
S3	Apr-92	<10	<10	10<	6J	1,200	5,400	2J	640	110	<10
	Sep-92	<1	<1	<1	0.3J	45.5	380	<1	24	10	<1
S4	Apr-92	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
S5	Apr-92	<10	5J	<10	<10	<10	3J	<10	3J	2J	5J
	Sep-92	2J	<1	<1	<1	<1	<1	<1	0.8J	<1	<1
S6	Apr-92	0.4J	<10	<10	<10	<10	4J	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1	0.5J	<1	0.1J	<1	<1
S7	Apr-92	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<11	1	1	0.2J	1	1	1	1
S8	Apr-92	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
S9	Apr-92	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
S10	Apr-92	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
S11	Sep-92	<1	<1	3J	<1	<1	0.3J	<1	46	<1	<1

Concentration are in ug/l

< indicates that the material was not detected above the minimum quantitation limit

J indicates an estimated value

Bold data is greater than the remediation goals stated in the ROD, except for benzene, chloroform, chlorobenzene, and xylenes which have no clean-up standard listed.

Table 5: Castle Hayne Aquifer Groundwater Results Remedial Investigation OU 1 (4/92) and OU 2 (9/93)						
Well	Date	Benzene	chloro- form	1,2-DCE (total)	PCE	TCE
C1	Apr-92	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1
C2	Apr-92	<10	2J	9J	1J	3J
	Sep-92	<1	<1	<1	<1	<1
C3	Apr-92	<10	<10	14	7J	28
	Sep-92	<1	<1	21	120	43
C4	Apr-92	<10	<10	<10	<10	<10
	Sep-92	<1	<1	<1	<1	<1
C5	Apr-92	18J	<100	<100	<100	17J
	Sep-92	<1	<1	<1	<1	<1
C9	Sep-92	<1	<1	<1	0.2	0.1
C10	Sep-92	<1	<1	<1	4.8	<1
C11	Sep-92	<1	<1	<1	0.64	<1

Concentration are in ug/l

< indicates that the material was not detected above the minimum quantitation limit

J indicates an estimated value

Bold data is greater than the remediation goals stated in the ROD,
except for benzene and chloroform which have no standard listed in the ROD.

Table 6: Summary of VOC Groundwater Analytical Results for 2002- 2003
Surficial Aquifer

Well	Date	Benzene	Chloro- form	Cyclo- hexane	cis-1,2- DCE	trans- 1,2-DCE	PCE	TCE	Vinyl Chloride	Total (b) VOCs
GW Goal		1.0	0.19	NS	70	70	1.0	2.9	1.0	
Surficial Wells										
S-1	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.32	< 0.5	< 0.5	0.32
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
S-2	May-02	< 10	< 10	1	180	9	340	160	24	708
	Aug-02	< 10	< 10	< 10	60	< 10	110	28	3	201
	Nov-02	< 10	< 10	< 10	48	< 10	87	19.5	3.5	138
	(a) Mar-03	< 10	< 10	< 10	89	< 10	100	49.5	8.0	224.5
S-3	May-02	< 10	< 10	< 10	4	< 10	23	2	< 10	29
	Aug-02	< 0.5	< 0.5	< 0.5	8.3	< 0.5	84	4.8	< 0.5	67.1
	Nov-02	< 0.5	< 0.5	< 0.5	12	< 0.5	80	8.3	1.9	82.2
	Mar-03	< 0.5	< 0.5	< 0.5	8.4	< 0.5	48	5.9	0.99	83.29
S-5	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1	< 0.5	< 0.5	1
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.59	< 0.5	< 0.5	0
S-6	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.2	< 0.5	< 0.5	0.2
	Mar-03	< 0.5	< 0.5	3.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	3.5
S-7	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5	0.5
S-8	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
S-9	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	0.19	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.19
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
S-10	Jan-02	< 10	< 0.5	< 10	< 10	< 10	< 10	< 10	< 10	0
	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.16	< 0.5	< 0.5	0.16
(a)	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
FWS-12	Jan-02	< 10	< 0.5	< 10	10	< 10	100	9	< 10	119
	May-02	< 10	< 10	< 10	9	< 10	92	9	< 10	110
	Aug-02	< 10	< 10	< 10	12	< 10	80	< 10	< 10	102
	Nov-02	< 10	< 10	< 10	12	< 10	87	8	< 10	87
	Mar-03	< 10	< 10	< 10	10	< 10	98	< 10	< 10	106
FWS-13	Jan-02	< 10	< 0.5	< 10	< 10	< 10	1	< 10	< 10	1
	May-02	< 10	< 10	< 10	< 10	< 10	3	< 10	< 10	3
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.2	< 0.5	< 0.5	1.2
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.9	0.51	< 0.5	3.41
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2	0.27	< 0.5	2.27
RWS-1A(a)	Jan-02	< 10	< 0.5	< 10	< 10	< 10	8	< 10	< 10	8
	Nov-02	< 0.5	< 0.5	< 0.5	0.20	< 0.5	5	0.22	< 0.5	5.42
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6	0.11	< 0.5	5.91
RWS-1	May-02	< 10	< 10	< 10	< 10	< 10	8	< 10	< 10	8
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
RWS-2A	Jan-02	< 10	< 0.5	< 10	1	< 10	17	1	< 10	19
	Aug-02	< 0.5	< 0.5	< 0.5	5.7	< 0.5	290	28	0.61	324.31
	Nov-02	< 10	< 10	< 10	2	< 10	98	2	< 10	102
	Mar-03	< 10	< 10	< 10	4	< 10	170	6	< 10	180
RWS-2	May-02	< 10	< 10	< 10	10	< 10	79	7	2	98
RWS-3A	Jan-02	< 10	< 0.5	6	100	1	780	240	21	1128
	May-02	< 10	< 10	< 10	48	< 10	920	93	< 10	1081
	Aug-02	< 10	< 10	4	38	< 10	970	88	4	1105
	Nov-02	< 10	< 10	3	46	< 10	500	150	9	708
	Mar-03	< 10	< 10	4	27	< 10	810	59	4	904
RWS-4A	Jan-02	< 10	< 0.5	< 10	54	< 10	280	35	< 10	358
	May-02	< 10	< 10	< 10	580	< 10	8900	500	93	8073
	Aug-02	1	< 10	10	310	3	3700	340	47	4411
	Nov-02	< 10	< 10	8	250	4	3100	280	58	3730
	Mar-03	< 20	< 20	2	240	3	1100	280	43	1668

See Table 7 for Notes

**Table 7: Summary of VOC Groundwater Analytical Results for 2002-2003
Castle Hayne Aquifer**

Well	Date	Benzene	Chloro- form	Cyclo- hexane	cis-1,2- DCE	trans- 1,2-DCE	PCE	TCE	Vinyl Chloride	Total (b) VOCs
GW Goal		1.0	0.15	NS	70	70	1.0	2.8	1.0	
Castle Hayne Wells										
C-1	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	(a) Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
C-2	May-02	< 10	< 10	< 10	< 10	< 10	1	< 10	< 10	1
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
C-3	May-02	< 10	< 10	< 10	5	< 10	270	27	< 10	302
	(a) Aug-02	< 10	< 10	< 10	5	< 10	140	23	< 10	168
	Nov-02	< 10	< 10	< 10	5	< 10	100	17	< 10	122
	Mar-03	< 10	< 10	< 10	5	< 10	150	25	< 10	181
C-4	Jan-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	0.19	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.19
C-5	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
C-9	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	May-02	< 10	< 10	< 10	< 10	< 10	1	< 10	< 10	1
	(a) Aug-02	< 0.5	3.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3.3
	Nov-02	< 0.5	4.3	< 0.5	< 0.5	< 0.5	0.48	< 0.5	< 0.5	4.78
C-10	Mar-03	< 0.5	0.105	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.105
	May-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.16	< 0.5	< 0.5	0.16
FWC-11	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Jan-02	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0
	(a) May-02	< 10	< 10	< 10	< 10	< 10	0.5	< 10	< 10	0.5
	Aug-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
C-12	Nov-02	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Mar-03	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0
	Jan-02	6	< 10	2	17	< 10	15	11	< 10	51
	May-02	2	< 10	3	13	< 10	7	2	< 10	27
C-13	Aug-02	< 0.5	< 0.5	< 0.5	9.7	< 0.5	1.7	0.78	< 0.5	12.18
	Nov-02	2.3	< 0.5	0.94	14	< 0.5	< 0.5	0.2	2.8	20.34
	Mar-03	0.75	< 0.5	1.6	1.1	< 0.5	< 0.5	0.28	3.1	6.83
	Jan-02	< 10	< 10	5	77	1	5400	390	4	5877
RWC-1(a)	May-02	< 10	< 10	< 10	53	< 10	140	13	1	207
	Aug-02	< 10	< 10	< 10	15	< 10	68	17	1	101
	Nov-02	< 10	< 10	< 10	< 10	< 10	44	8	< 10	50
	Mar-03	< 10	< 10	< 10	< 10	< 10	6	< 10	< 10	6
RWC-2(a)	May-02	< 10	< 10	< 10	8	< 10	155	61	< 10	222
	Aug-02	< 10	< 10	1	16	< 0.5	380	170	< 10	547
	Nov-02	< 10	< 10	< 10	< 10	< 10	29	2	< 10	31
	Mar-03	< 10	< 10	< 10	< 10	< 10	22	2	< 10	24
RWC-2(b)	Jan-02	< 10	< 10	4	57.5	1	1350	270	18	1700.5
	May-02	< 10	< 10	1	31	< 10	1790	180	1	1893
	Aug-02	< 10	< 10	2	79	< 10	2300	190	10	2581
	Nov-02	< 10	< 10	< 10	22	< 10	2000	170	3	2195
	Mar-03	< 20	< 20	4	45	< 20	2090	250	4	2306

Notes

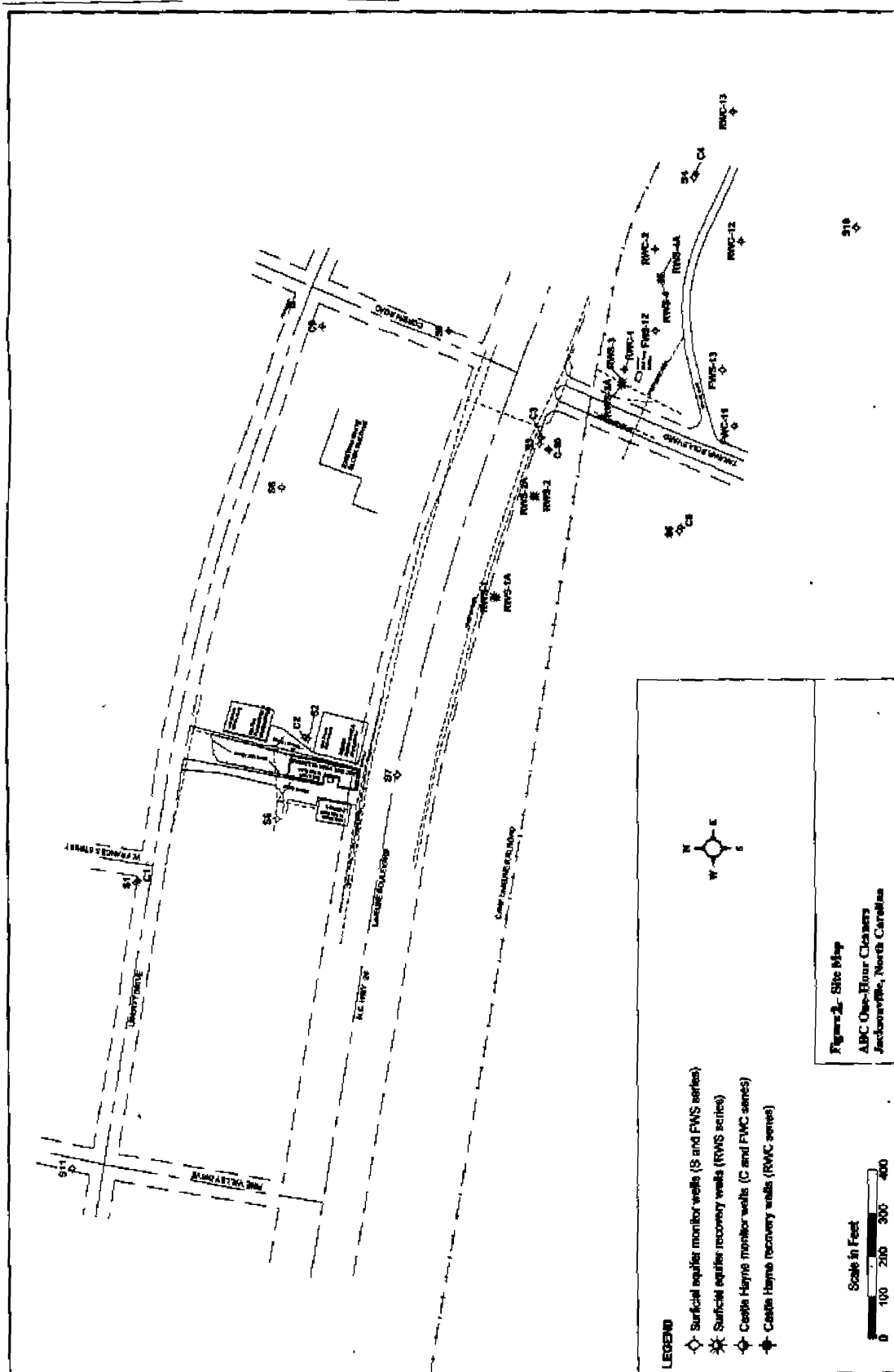
Groundwater Goals are the remediation goals from the ROD, except for benzaene and chlraform which are the North Carolina Groundwater Standards. No standard established for cyclohexane.

Concentrations In ug/L

(a) Average of duplicate Samples.

(1b) Total of VOCs listed on table only.

• Reported as cis/trans-1,5,5,1-dichloroethene. Assumed to be cis-1,2-DCE based on historical data.



Soil Sample Analysis Results Summary Operable Unit 1(6/1991) and Operable Unit 2 (9/1993) Concentrations reported in ug/kg or parts per billion						
Sample Identification ¹	PCE	TCE	1,2-DCE (total)	Vinyl Chloride	Chloroform	1,1-DCE
SS-001-01-06*	640	96	98	<57	<29	<29
SS-001-01-10*	37	2J	<6	<11	<6	<6
SS-001-01-14*	440	16J	<28	<56	<28	<28
SS-002-01-02*	10	2J	<5	<11	<5	<5
SS-002-01-06*	19	72	200	42	<8	<8
SS-002-01-10*	27J	110	730	55J	<30	<30
SS-002-01-14*	<740	<740	1,800	<1,500	<740	<740
SS-014-01-00	90	<11	<11	<11	<11	<11
SS-014-01-05	870	18	20	<11	<11	<11
SS-014-01-10	210	12	<12	<12	<12	<12
SS-015-01-00	20	<11	<11	<11	<11	<11
SS-015-02-04	<13	<13	17	<13	<13	<13
SS-016-01-2	48,000	2,500J	400J	<12	17	<12
SS-018-02-5	27,000	920J	150	<12	10J	<12
SS-016-03-10	200	20	50	<12	<12	<12
SS-016-04-15	390	28	22	<11	<11	<11
SS-017-01-2	14	<11	<11	<11	<11	<11
SS-017-02-5	1,400J	200	290J	<12	<12	<12
SS-017-03-10	650	130	330	<54	<54	<54
SS-017-04-15	1,400J	110	210	<62	<62	<62
SS-018-01-02	830,000	<43,000	<43,000	<43,000	<43,000	<43,000
SS-018-01-02A	2,100,000	33,000	<31,000	<31,000	<31,000	<31,000
SS-018-02-05	110,000	280,000	110,000	<16,000	<16,000	<16,000
SS-019-01-02	12,000	11,000	4,300	<1,300	<1,300	<1,300
SS-019-02-02A	300,000	120,000	<47,000	<47,000	<47,000	<47,000
SS-019-02-05	4,900	1,400	3,100	190	<12	<12
SS-019-03-09	18	<12	<12	<12	<12	<12
SS-019-04-15	5,100	<1,400	840J	<1,400	<1,400	<1,400
SS-020-01-00	170	14	<11	<11	<11	<11
SS-021-01-00A	94	14	<11	<11	<11	<11
SS-022-01-02	580,000	15,000	720	<7,000	<7,000	<7,000
SS-022-01-02A	790,000	<130,000	<130,000	<130,000	<130,000	<130,000
SS-022-02-05	12,000	1,000J	2,400	<1,500	<1,500	<1,500
SS-022-03-10	26,000	1,700	3,700	<1,500	<1,500	<1,500
SS-022-04-15	2,900	<1,400	670J	<1,400	<1,400	<1,400
SS-023-01-02	410,000J	3,800J	85J	<14	<14	<14
SS-023-02-05	120	23	12J	<12	<12	<12
SS-023-03-10	20	14	37	<13	<13	<13
SS-023-04-15	44	85	180	<12	<12	<12
SS-SPM1-01-00	49,000	1,000J	940J	<1,400	<1,400	<1,400
SS-SPM1-02-05	7,500	790J	1,500	<1,400	<1,400	<1,400
SS-SPM1-03-10	7,100	530J	1,200J	<1,400	<1,400	<1,400
SS-SPM1-04-14	8,900	780J	1,800	<1,400	<1,400	<1,400
SS-SPM2-01-00	4,400	730J	900J	<1,300	<1,300	<1,300
SS-SPM2-02-05	11,000	1,600	2,300	<1,400	<1,400	<1,400
SS-SPM2-02-05A	14,000	2,200	3,100	<1,500	<1,500	<1,500
SS-SPM2-03-10	15,000	1,500	2,000	<26	<27	<27
SS-SPM2-04-15	6,000	<1,400	<1,400	<1,400	<1,400	<1,400
SS-SPM5-01-00	43,000	<2,500	<2,500	<2,500	<2,500	<2,500
SS-SPM5-02-05	11,000	<12	6,100	79	<12	<12
SS-SPM5-03-10	3,000	<1,400	<1,400	<1,400	<1,400	<1,400
SS-SPM5-04-15	13,000	<1,300	990J	<1,300	<1,300	<1,300
SS-V1-01-10	33,000	810J	1200J	<1,400	<1,400	<1,400
SS-V1-02-14	47,000	1,700	3,000	<1,400	<1,400	<1,400
SS-V1-02-14A	180,000	1,100J	<1,400	<1,400	<1,400	<1,400
SS-V2-01-02	180,000J	36,000J	20,000J	<20	<20	<20
SS-V2-02-05	5,400J	510	370	<38	<39	<39

¹Table contains samples that have compounds above the quantitation limit. Therefore, some samples were omitted from the table.

*OU 1 samples collected June 1990 Key: SS-0.001-01-00 is soil sample; soil boring number; OU 1: sample collection depth.

Otherwise, SS-022-03-10 is soil sample; soil boring number, sample Interval; sample collection depth.

J- estimated value

c- not detected above quantitation limit

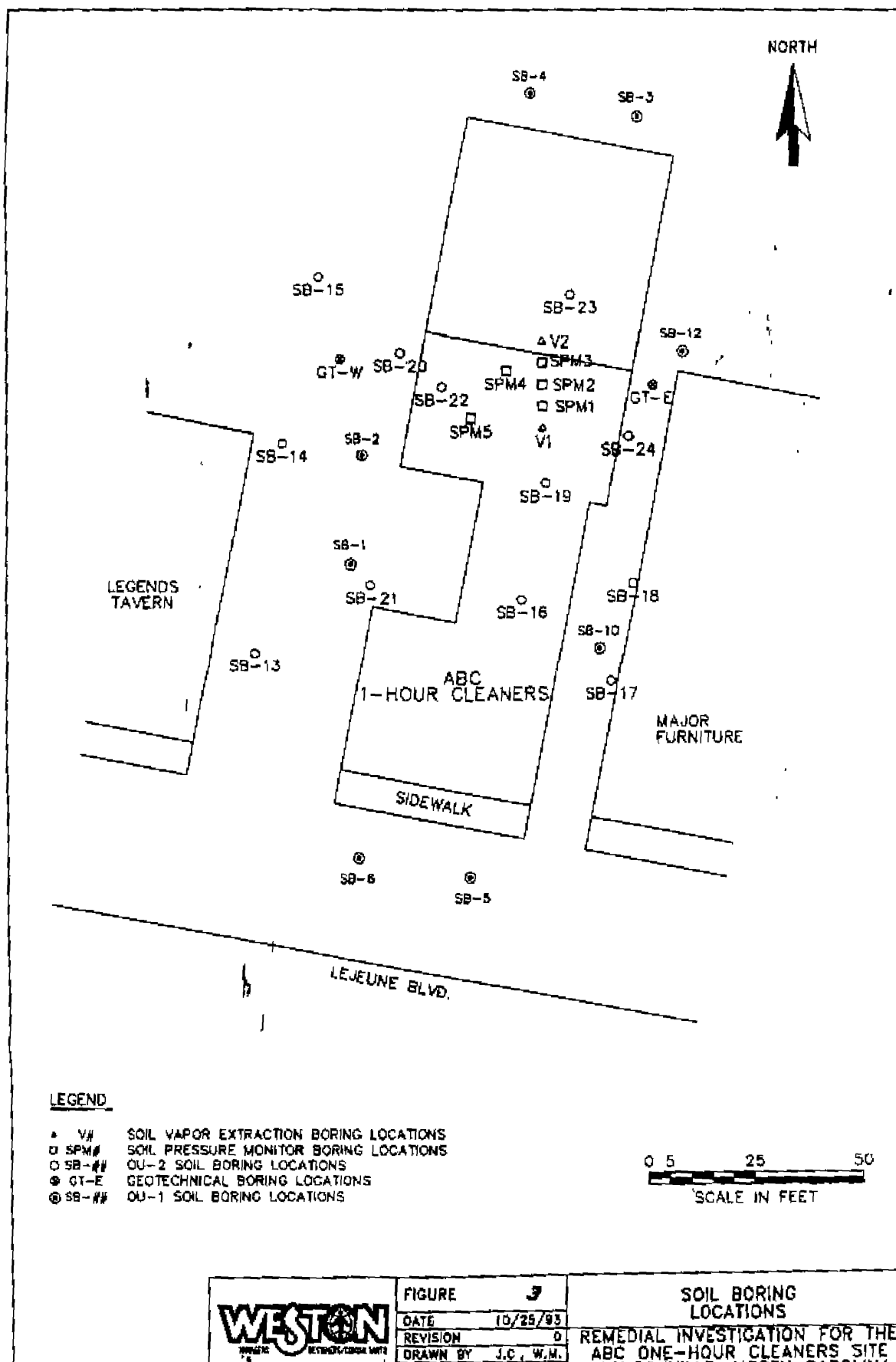
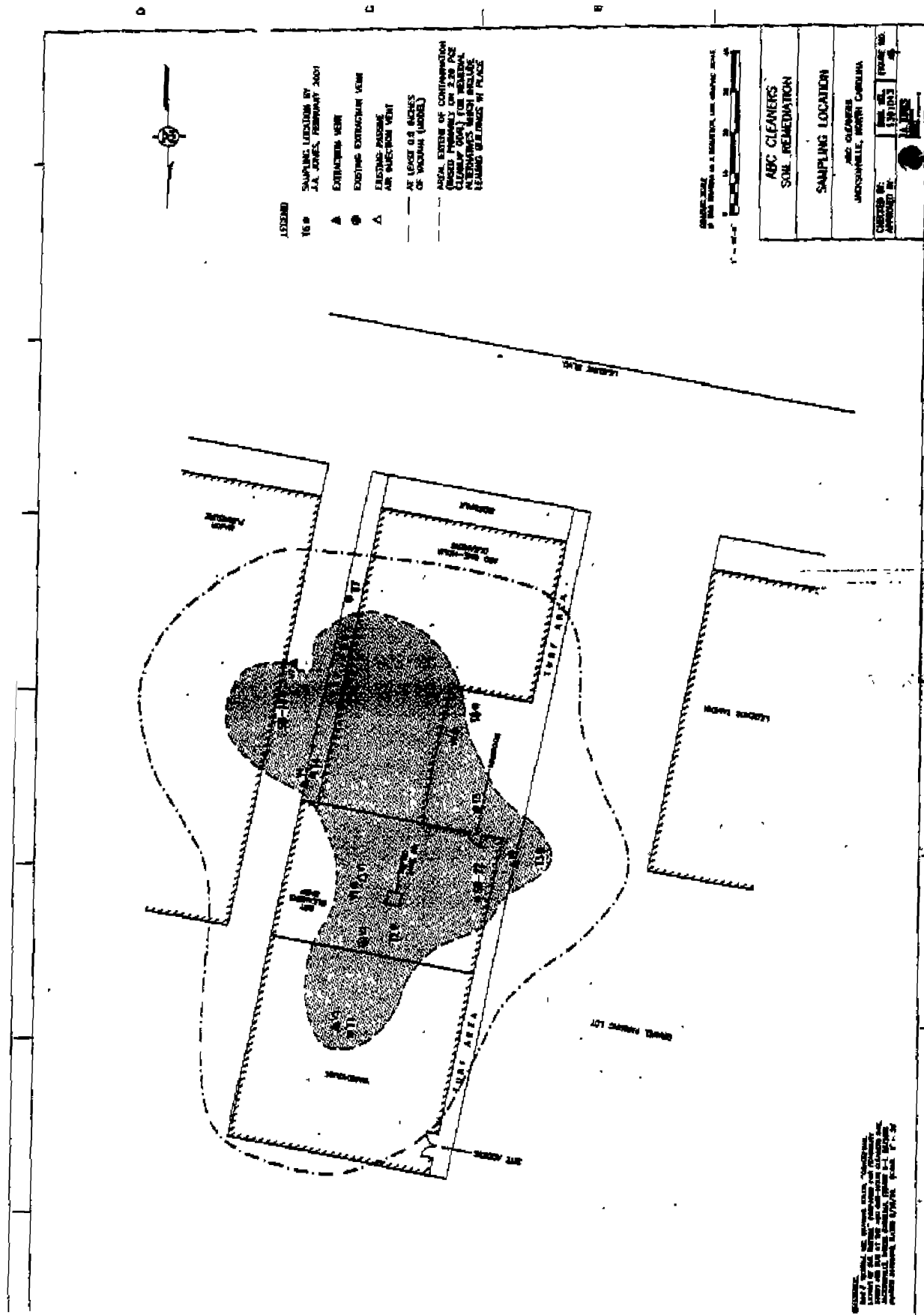


Table 9: Summary of the Soil Sampling Analytical Results
from February 2001, January 2002,
Various Other Historical Data

Soil Boring	Depth (ft)	Chemical	Remedial Goal	Feb. 2001 Result	Jan. 2002 Result	Historical Results	
SB-18	1	PCE	2.16	NS	1.5	830 / 2,100	Collected from SB-18, 1' Depth, 1993
	1	TCE	0.90	NS	0.03	33	
	1	DCE	21.0	NS	0.24	<31	
	2	PCE	2.16	65	0.1	NS	See results listed above
	2	TCE	0.90	7.4	0.015	NS	
	2	DCE	21.0	< 0.0068	0.013	NS	
	4	PCE	2.16	33	NS	110	Collected from SB-18, 5' Depth, 1993
	4	TCE	0.9	5.1	NS	260	
	4	DCE	21.0	< 0.0046	NS	110	
SB-22	2	PCE	2.16	72	0.021	790 / 580	Collected from SB-22, 2' Depth, 1993
	2	TCE	0.9	40	ND	15	
	2	DCE	21.0	< 0.52	ND	0.72	
	15	PCE	2.16	2.8	5.5	2.9	Collected from SB-22, 15' Depth, 1993
	15	TCE	0.9	< 0.49	0.2	<1.4	
	15	DCE	21.0	< 0.49	0.2178	0.67	
T-2	6	PCE	2.16	170	0.06	5.4	Collected from V-2 (~8 NE), 5' Depth, 1993
	6	TCE	0.9	<0.55	ND	0.51	
	6	DCE	21.0	<0.55	ND	0.37	
	10	PCE	2.16	8,300	7,100	2.3 / 0.58	Collected from V-2 (~8 NE), 10' Depth, 1993
	10	TCE	0.9	21	ND	0.091 / 0.11	
	10	DCE	21.0	<0.49	ND	0.083 / 0.095	
T-3	3	PCE	2.16	3,500	0.97	0.01	Collected from SB-2 (~5' W.), 2' Depth, 1991
	3	TCE	0.9	61	0.11	0.002J	
	3	DCE	21.0	<0.0051	0.031	<0.005	
T-4	20	PCE	2.16	660	3.6		No adjacent historical samples
	20	TCE	0.9	9	0.03		
	20	DCE	21.0	< 0.0053	1.013		
T-5	2	PCE	2.16	7.5	0.14		No adjacent historical samples
	2	TCE	0.9	2.9	0.019		
	2	DCE	21.0	<0.500	0.012		
T-6	4	PCE	2.16	10	ND		No adjacent historical samples
	4	TCE	0.9	0.076	ND		
	4	DCE	21.0	0.0052	ND		
T-7	6	PCE	2.16	2.4	ND	1.4	Collected from SB-17 (~10' E.) 5' Depth, 1993
	6	TCE	0.9	0.0097	ND	0.2	
	6	DCE	21.0	<0.0064	ND	0.29	
V-1	2	PCE	2.16	5,200	52	49	Collected from SPM1 (~7' N.), 2' Depth, 1993
	2	TCE	0.9	130	0.088	1	
	2	DCE	21.0	<0.650	0.045	0.94	

Concentrations in mg/kg



LEGEND

- 16.0 SAMPLING LOCATION BY J.A. JONES, FEBRUARY 2001
- ▲ EXHAUSTION VENT
- EXISTING EXHAUSTION VENT
- △ EXISTING PASSING AIR INJECTION VENT
- AT LEAST 0.5 INCHES OF THICKNESS (MODEL)
- - - AREA EXTENT OF CONTAMINATION (BASED PRIMARILY ON 2.00 PPM CHLORINE GAS) FOR REMEDIAL ACTIVITIES WHICH INCLUDE REMOVAL OF SOLIDS IN PLACE



ABC CLEANERS SOIL REMEDIATION	
SAMPLING LOCATION	
ABC CLEANERS UNIONVILLE, NORTH CAROLINA	
DATE: 02/01/01	SCALE: 1"=100'
CHECKED BY: J.A. JONES	APPROVED BY: [Signature]

NOTES:
1. THIS MAP IS A SUMMARY OF THE REMEDIATION ACTIVITIES.
2. THE REMEDIATION ACTIVITIES WERE CONDUCTED BY J.A. JONES, FEBRUARY 2001.
3. THE REMEDIATION ACTIVITIES WERE CONDUCTED AT THE ABC CLEANERS SITE, UNIONVILLE, NORTH CAROLINA.
4. THE REMEDIATION ACTIVITIES WERE CONDUCTED AT THE ABC CLEANERS SITE, UNIONVILLE, NORTH CAROLINA.
5. THE REMEDIATION ACTIVITIES WERE CONDUCTED AT THE ABC CLEANERS SITE, UNIONVILLE, NORTH CAROLINA.

5.6 Site inspection

The site inspection of the ABC Cleaners site was conducted on May 5, 2003. Attending the site visit were:

- Daniel Hockett, Terraine Project Manager (Weston subcontractor for OU 1), Charlotte, NC Office
- Jim Tan, J. A. Jones, Project Manager (Weston subcontractor for OU 2), Cherry Point, NC Office
- Regina Berry, J. A. Jones, Technical Assistant, Cherry Point, NC Office

NC DENR staff met on site to inspect the remediation systems, areas surrounding the systems for security and safety, and interview the subcontractors operating the systems. The groundwater pump and treat system is located on the USMC Camp Lejeune property. The system is located within a utility house and is secure. Daniel Hockett was the project manager for this system. He gave a complete overview of the system and of the monitoring and extraction wells. During the visit, it was noted that an alarm within the building was sounding. Mr. Hackett stated that the alarm light had been staying on in the control panel since Terrains began operations at the site. This light referred to the bag filter system actuator which was originally designed to direct flow to either one of two parallel filters based on the pressure differential. However, the system has not been operated in this mode (the pressure differential meter had been disconnected by Foster Wheeler). Therefore, this error message was meaningless. The PLC has been reprogrammed such that the valve directing the flow is not monitored by the PLC. The valve has been positioned to split the flow equally between the two filters. Also inside the building was a leak from the discharge pump and possibly leaking to the outside of the building. Water stains were visible on the foundation of the building. It was also noted that one empty 55-gallon drum, eight 55-gallon drums with Feremede, one 25-gallon drum with calsparce, an air stripper tray, and piping were located adjacent to and behind the building. The location of all the monitoring wells were observed and appeared to be secure. Mr. Hackett then pointed out that the wells labeled C-4 and 5-4 are mislabeled, based on conflicting information on the well tag and the actual well depths gathered during a recent sampling event. Mr. Hackett also stated that for the weekly inspections, replacement of filters, and emergency response, Eastern Environmental Operators from Vanceboro, NC were subcontracted by Terraine. After the visit/walk-through with Terraine, Mr. Hackett began to sample the wells for environmental monitoring requirements. Since the site inspection most of the above-mentioned issues have been addressed.

The second meeting during the site visit was to inspect the SVE system operated by J. A. Jones. Jim Tan (project manager) and Regina Berry (technical assistant) were present for the visit. NC DENR staff had several questions regarding the system operations, sampling and monitoring procedures, and emergency response activities. Several of the questions were unknown by the J. A. Jones staff, especially regarding the operations of the system and emergency response activities. We were referred to Wade

Lewis, former operator and project manager for the site, for these answers. While on the ABC property, it was noted that the SVE system was secure, the building was locked, and the extraction wells were bolted and secure.

5.7 Interviews

The following persons were interviewed regarding the activities and implementation of the remedial actions at the ABC One Hour Cleaners site:

Mr. Luis Flores, Remedial Project Manager, US EPA Region IV:

Mr. Flores stated in his email that this is a statutory review not a policy five-year review. The reason for this being a statutory review is because contaminated soil will be left on the property and that the use of the property will be restricted for this reason. He stated that the building needs to remain on site to keep soil from leaching, as explained in the ROD. Therefore, institutional controls need to be implemented. He also stated based on the most recent groundwater data, it appears that the groundwater pump and treat system is not containing the entire plume and the contamination may have migrated beyond the extraction wells. Mr. Flores stated that there are no groundwater users downgradient of the contaminated plume.

Mr. Brian McGee, Project Manager, Weston:

Mr. McGee, regarding the groundwater remediation, stated that he had recommended remediating at least part of the plume using in situ bioremediation with hydrogen release compounds. But if the concentrations continue to lower and no downgradient receptors would be impacted then monitored natural attenuation (MNA) would also be worth a closer look.

Several interviews were conducted while visiting the site on May 5, 2003. As stated previously, Daniel Hockett (Terraine, project manager), Jim Tan (J. A. Jones, project manager), and Regina Berry (J. A. Jones, technical assistant) were interviewed regarding the status, sampling and monitoring, and performance of the remediation systems. These interviews brought up several issues with each system but most importantly the issue of an emergency response procedure and contacts for immediate action, if needed.

6.0 Technical Assistance

6.1 *Question A: is the remedy functioning as intended by the decision documents?*

Groundwater

The remedial action continues to be operating as designed. However, one of the remedial action objective (RAO) is to restore the surficial and Castle Hayne aquifers to its

beneficial use (ie: for drinking water). Based on recent groundwater data from Weston's Groundwater Sampling results dated November 2002, several conclusions were drawn: VOC plume appears to be elongating to the east-southeast in both aquifers, plume appears to have migrated further into the Castle Heyne than in the surficial aquifer, analytical data shows that the recovery wells are placed in appropriate locations due to the highest concentrations of VOC, and presence of cis-1,2-DCE and vinyl chloride indicating that PCE and TCE are readily degrading (although PCE and TCE are still higher than daughter products).

The remedy, being groundwater recovery by extraction wells and treatment by air stripping, may not be containing the entire contaminated plume and preventing the migration of site contaminants at this time. Although the frequent equipment breakdowns and other past operator issues have caused the remediation system to be out of service for years at a time. A formal review should be conducted for optimizing the remedial systems for groundwater. There are no groundwater receptors downgradient from the site.

Implementation of institutional controls recommended by the ROD have not occurred to date. The ROD states that institutional controls will be placed on well construction and water use in the general area of the site. This matter is discussed further in the Issues and Recommendations section of this review.

Soil

The remedial action objectives (RAOs) for soils were developed to prevent direct contact exposure to soils containing levels of contaminants that produce unacceptable risk levels and prevent migration of contamination from soil to groundwater. The soil clean-up goals, as stated in the ROD, are based on the buildings/structures to remain present and intact on the property as a protective barrier from the soil contamination and to decrease leaching into the groundwater. To date, no institutional controls have been implemented.

6.2 Question B: Are the exposure assumptions, toxicity data, clean-up levels and remedial action objectives (RAQs) used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. However, as stated previously in Section 5.4, analytical capabilities have changed since the ROD for OU1 was prepared. Most significantly, quantitation limits in most cases are lower than the ROD clean-up levels. It is now technically possible to obtain lower quantitation limits in water samples for two site specific compounds, PCE and vinyl chloride. At the time of the ROD, the quantitation limits for PCE and vinyl chloride were 1 ug/l. This limit of 1 ug/l was then specified in the ROD as the clean-up goals in groundwater for PCE and vinyl chloride. Currently, the quantitation limits for PCE and vinyl chloride are 0.5 ug/l. The NC Groundwater Standard, as stated in the NC Drinking Water and Groundwater Standards; Groundwater Classifications and

Standards (NCAC Title15 Chapter 2L) is 0.7 ug/l for PCE and 0.015 ug/l for vinyl chloride. Therefore, clean-up goals of 0.7 ug/l for PCE and 0.5 ug/l for vinyl chloride would be changed to reflect these new values.

6.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light that could call into question the protectiveness of the remedy.

6.4 Technical Assessment Summary

The most significant issues regarding the protectiveness of the remedy are whether the groundwater extraction system is containing and capturing the contaminant in the most efficient manner, the tack of institutional controls; and the clean-up goals reflecting the new quantitation limit for PCE and vinyl chloride.

7.0 Issues

There are several issues/problems that have been Identified during this review. Each is discussed further in the recommendation section of this report.

- Implementation of institutional controls as stated in the RODs.
- Groundwater contamination in the surficial and Castle Hayne aquifers may not be contained. it is not clear that the zone of influence of the recovery wells is capturing downgradient contamination,
- The extent of contamination needs to be investigated in the Castle Hayne aquifer. The concentration of PCE in C-13, the furthest down gradient well, is above the cleanup goal.
- It is now technically possible to obtain lower quantitation limits in water samples for two site specific compounds, PCE and vinyl chloride, Therefore, dean-up goals of 0.7 ug/l for PCE and 0.5 ug/l for vinyl chloride would be changed to reflect these new values.
- The leak in the groundwater treatment building needs to be fixed. Treated groundwater is leaking from a pipe near the air stripper trays. The leaking water is not released around the building but is collected by a sump area and pumped back into the holding tank for retreatment.
- An evaluation of a possible release of water is needed around the groundwater treatment building. Staining was observed at the bottom of the treatment building.

- The aesthetics of the area surrounding the groundwater treatment building need to be addressed. Nine drums, an air stripper tray, and unused piping were observed around the outside of the building.
- Soil monitoring needs to be more routine. Sampling of the soil needs to be performed on a more routine basis to determine the success of the soil venting extraction system.

8.0 Recommendations and Follow-up Actions

Table 10: Recommendations and Follow-up Actions

ISSUES	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
institutional controls for the site as proposed in the RODS have not been Implemented.	implement Institutional controls and review implementation in next five-year review	EPA & State	EPA & State	Before next five-year review	N	N
Groundwater contamination In the surficial and Castle Hayne aquifers may not be contained.	A formal review should be conducted for optimizing the remedial systems for groundwater.	EPA & State	EPA & State	Before next five-year review	N	Y
Extent of contamination needs to be Investigated in the Castle Hayne Aquifer.	Mere groundwater investigation is needed In the Castle Hayne Aquifer.	EPA & State	EPA & State	Before next five-year review	N	Y
Groundwater clean-up goals should reflect new lower quantitation limits	ROD needs to be modified to reflect new goals.	EPA & State	EPA & State	Before next five-year review	N	N
Treated groundwater is leaking from a pipe near the air stripper trays.	Leak In the groundwater treatment building needs to be fixed.	EPA	EPA	2003	N	N
Staining observed at the bottom of the treatment building.	Evaluation of a possible release of water is needed around the groundwater treatment building.	EPA	EPA	2003	N	N
Aesthetics of the area surrounding the groundwater treatment system need to be addressed.	Housekeeping practices around tie treatment buildings need to be kept up continuously.	EPA	EPA	2003	N	N
Soil Monitoring needs to be more routine to determine the success of the soil venting extraction system.	Scheduled sampling needs to be developed for soil monitoring.	EPA & State	EPA & State	Before next five-year review	N	N

9.0 Protectiveness Statement

The remedies at OU1 and OU 2 currently protect human health and the environment in the short-term because the main source of contamination is being remediated through the soil vapor extraction system and currently no human exposure pathways exist to contaminated soil or groundwater. However, in order for the remedies to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness: implementation of institutional Controls as stated in the RODs; A formal review should be conducted for optimizing the remedial systems for groundwater; and Further groundwater investigation of the Castle Hayne Aquifer.

10.0 Next Review

The next Five-Year Review for the ABC One-Hour Cleaners site is scheduled for August 2008, five years from the date of this review.

ATTACHMENT 1

List of Documents Reviewed ABC One Hour Cleaners Five Year Review

Roy F. Weston, Inc. November 1992. Remedial Investigation Report, Revision 1, ABC One Hour Cleaners, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV. January 28, 1993 Record Of Decision, Operable Unit #1: Groundwater, ABC One Hour Cleaners Site, Jacksonville, North Carolina.

Roy F. Weston, Inc. May 1994 Remedial Investigation Report, Revision 1, ABC One Hour Cleaners, Operable Unit 2, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV, July 7, 1994. Draft Performance Remedial Design (RD), ABC One Hour Cleaners Site, Operable Unit 1 - Groundwater, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV. September 7, 1994 Signed Record Of Decision, ABC One Hour Cleaners Site Operable Unit 2 (OU2)- Soil, Jacksonville, North Carolina.

Roy F. Weston, inc. October 1994. Work Plan Remedial Design/Solicitation Package Project Assistance, Revision 0, Volume 1-Technical. ABC One Hour Cleaners, Operable Unit 2, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV. May 17, 1995. Performance Specs Remedial Design (RD), ABC One Hour Cleaners Site Operable Unit 2 (OU2)- Soils, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV. April 1991 through January 1998. Fact Sheet Updates, ABC One Hour Cleaners Superfund Site, Jacksonville, Onslow County, North Carolina.

Roy F. Weston, Inc. March 2001. Mixing Analysis for Proposed NPDES Permit Modification. ABC One Hour Cleaners, Jacksonville, North Carolina.

Roy F. Weston, Inc. May 2002. Interim Remedial Action Report. ABC One Hour Cleaners, Operable Unit 1 Groundwater Remediation, Jacksonville, North Carolina.

U. S. Environmental Protection Agency, Region IV. July 2002. Superfund Preliminary

Close-Out Report, ABC One Hour Cleaners Superfund Site, Jacksonville, Onslow County, North Carolina.

Roy F. Weston, Inc. February 3, 2003. ABC One-Hour Cleaners Groundwater Sampling Results-November 2002.

Roy F. Weston, Inc. May 2000 through November 2002. ABC Cleaners Weekly Update (email).

ATTACHMENT 2

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Daniel Hockett	O & M Project Manager	Terraine	May 5, 2003
Name	Title/Position	Organization	Date
Jim Tan	O & M Project Manager	J. A. Jones	May 5, 2003
Name	Title/Position	Organization	Date
Regina Berry	Technical Assistant	J. A. Jones	May 5, 2003
Name	Title/Position	Organization	Date

INTERVIEW RECORD			
Site Name: ABC One Hour Cleaners		EPA ID No.: NCD 024644494	
Subject: Site Inspection for 5-Year Review		Time: 1200	Date: 5/5/03
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other Location of Visit: Groundwater Treatment System			
Contact Made By:			
Name: Nile Testerman	Title: Env. Engineer	Organization: NC DENR	
Individual Contacted:			
Name: Daniel Hockett	Title: O & M Project Manager	Organization: Terraine	
Telephone No: (704) 889-0004 Fax No: (345) 513-4902 E-Mail Address: dhockett@terraine.com		Street Address: 600 Towne Centre, Suite 308 City, State, Zip: Pineville, NC 28134	
Summary Of Conversation			
See report and checklist for the summary of the site visit.			

Site Inspection Checklist

I SITE INFORMATION			
Site name: ABC One Hour Cleaners- OU 1		Date of inspection: May 5, 2003	
Location and Region: Jacksonville, Qnslow County, NC; Region IV		EPA ID: NCD 024644494	
Agency, office, or company leading the five -year review: NC DENR, Super-fund Section		Weather/temperature: overcast: and mild	
Remedy Includes: (Check all that apply) <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 48%;"> <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input checked="" type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other </div> <div style="width: 48%;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </div> </div>			
Attachments; <input type="checkbox"/> Inspection team roster attached* <input type="checkbox"/> Site map attached* *See Report			
II. INTERVIEWS (Check all that apply)			
1. O&M site manager <u>Brian McGee</u> <u>Weston, Project Manager</u> <u>May 5, 2003</u> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 30%;">Name</div> <div style="width: 30%;">Title</div> <div style="width: 30%;">Date</div> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input checked="" type="checkbox"/> by phone Phone no. <u>(610) 701-3097</u> Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____ _____			
2. O&M staff <u>Daniel Hockett</u> <u>Terraine.O&M Project Manager</u> <u>May 5. 2003</u> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 30%;">Name</div> <div style="width: 30%;">Title</div> <div style="width: 30%;">Date</div> </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no, (704) 889-0004 Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____ _____			

Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of calk health or environmental health, zoning office, recorder of deeds, or ether city and county offices, etc.) Fill in all that apply.

Agency _____
 Contact _____
 Name Title Date Phone no.
 Problems; suggestions; ☐ Report attached

Agency _____
 Contact _____
 Name Title Date Phone no.
 Problems; suggestions; ☐ Report attached

Agency _____
 Contact _____
 Name Title Date Phone no.
 Problems; suggestions; ☐ Report attached

Agency _____
 Contact _____
 Name Title Date Phone no.
 Problems; suggestions; ☐ Report attached

4. **Other interviews (optional)** ☒ Report attached.

US EPA conducted the community interviews for the site. See report.

Additional interviews were conducted for OU 2 (soil) These findings are located in the following check list.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents <input checked="" type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
2.	Site-Specific Health and Safety Plan <input checked="" type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	O&M and OSHA Training Records Remarks _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input checked="" type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other Permits Remarks _____	<input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
5.	Gas Generation Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
6.	Settlement Monument Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
7.	Groundwater Monitoring Records Remarks <u>Did not have document on site but data is readily available</u>	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input checked="" type="checkbox"/> Water (effluent) Remarks <u>Samples in March and April but data not yet available</u>	<input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
10.	Daily Access/Security Logs Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A

Site Inspection Checklist - 4

C. Institutional Controls (ICs)			
1. Implementation and enforcement			
Site conditions imply ICs not properly implemented		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) _____			
Frequency _____			
Responsible party/agency _____			
Contact _____			
Name _____ Title _____		Date _____	Phone no. _____
Reporting is up-to-date		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Other problems or suggestions; <input type="checkbox"/> Report attached		_____	
_____		_____	
_____		_____	
2. Adequacy <input type="checkbox"/> ICs are adequate <input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A			
Remarks _____			

D. General			
1. Vandalism/trespassing <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident			
Remarks _____			

2. Land use changes on site <input checked="" type="checkbox"/> N/A			
Remarks _____			

3. Land use changes off site <input checked="" type="checkbox"/> N/A			
Remarks _____			

VI. GENERAL SITE CONDITIONS			
A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Roads damaged <input checked="" type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A			
Remarks <u>See report</u>			

B. Other Site Conditions		
Remarks <u>The aesthetics of the area surrounding the groundwater treatment building need to be addressed. Nine drums, air stripper tray, and unused piping were observed around the outside of the building.</u>		
VII. LANDFILL COVERS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
A. Landfill Surface		
1.	Settlement (Low spots) Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident
2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Cracking not evident
3.	Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident
4.	Holes Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Holes not evident
5.	Vegetative Cover <input type="checkbox"/> Grass <input type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	
6.	Alternative Cover (armored rock, concrete, etc.) Remarks _____	<input type="checkbox"/> N/A
7.	Bulges Areal extent _____ Height _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Bulges not evident
8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	

9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
Areal extent _____				
Remarks _____				
B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A				
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks _____				
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks _____				
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks _____				
C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A				
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies,)				
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement	
Areal extent _____ Depth _____				
Remarks _____				
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation	
Material type _____ Areal extent _____				
Remarks _____				
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion	
Areal extent _____ Depth _____				
Remarks _____				
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting	
Areal extent _____ Depth _____				
Remarks _____				
5.	Obstructions	Type _____	<input type="checkbox"/> No obstructions	
<input type="checkbox"/> Location shown on site map Areal extent _____				
Size _____				
Remarks _____				

6.	Excessive Vegetative Growth <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Remarks _____ _____	Type _____ Areal extent _____
D. Cover Penetrations <input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____ _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____ _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
3.	Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____ _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
4.	Leach ate Extraction Wells <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____ _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
5.	Settlement Monuments Remarks _____ _____	<input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A

E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Gas Treatment Facilities <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
2.	Gas Collection Wells, Manifolds and Piping <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Gas Monitoring Facilities (<i>e.g.</i> , as monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Outlet Pipes Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
2.	OutLet Rock Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation Areal extent _____ Depth _____ <input type="checkbox"/> N/A <input type="checkbox"/> Siltation not evident Remarks _____ _____		
2.	Erosion Areal extent _____ Depth _____ <input type="checkbox"/> Erosion not evident Remarks _____ _____		
3.	Outlet Works <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
4.	Dam <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		

H. Retaining Walls		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Deformations Horizontal displacement _____ Rotational displacement _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
2.	Degradation Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
2.	Vegetative Growth <input type="checkbox"/> Vegetation does not impede flow Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
3.	Erosion Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
4.	Discharge Structure Remarks _____	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
2.	Performance Monitoring <input type="checkbox"/> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____	<input type="checkbox"/> Evidence of breaching

IX. GROUNDWATER/SURFACE WATER REMEDIES		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input type="checkbox"/> NA
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> NA Remarks _____ _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____ _____		

C. Treatment System		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input checked="" type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input checked="" type="checkbox"/> Filters <u>Particulate filters</u> <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually <input type="checkbox"/> Quantity of surface water treated annually Remarks _____ 		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ 		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good Condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ 		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input checked="" type="checkbox"/> Needs Maintenance Remarks <u>Leaks and plumbing need attention</u> 		
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp, roof and doorways) <input checked="" type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks <u>Water staining near foundation and leak inside building</u> 		
6.	Monitoring Wells (pump and treatment remedy) <input checked="" type="checkbox"/> secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks <u>However, wells S-4 and C-4 are mislabeled</u> 		
D. Monitoring Data			
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining in some wells		

D. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition
	<input checked="" type="checkbox"/> N/A		
Remarks			
X. OTHER REMEDIES			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
XI. OVERALL OBSERVATIONS			
A. Implementation of the Remedy			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
See text of five-year report			
B. Adequacy of O&M			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			
See text of five-year report			
C. Early Indicators of Potential Remedy Problems			
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.			
See text of five-year report			
D. Opportunities for Optimization			
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy			
See text of five-year report			

INTERVIEW RECORD		
Site Name: ABC One Hour Cleaners		EPA ID No.: NCD 024644494
Subject: Site Inspected for 5-Year Review		Time: 1400 Date: 5/5/03
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other Location of Visit: ABC One Hour Cleaners		
Contact Made By:		
Name: Nile Testerman	Title: Env. Engineer	Organization: NC Denr
Individual Contacted:		
Name: Jim Tan Regina Bery	Title: O & M Project Manager Technical Assistant	Organization: J.A. Jones Environmental Services
Telephone No. (252) 466-9455 Fax No. E-Mail Address:	Street Address: City, State, Zip:	
Summary of Conversation		
See report and checklist for the summary of the site visit.		

Site Inspection Checklist

I SITE INFORMATION			
Site name: ABC One Hour Cleaners- OU 2		Date of inspection: May 5, 2003	
Location and Region: Jacksonville, Qnslow County, NC, Region IV		EPA ID: NCD 024644494	
Agency, office, or company leading the five -year review: NC DENR, Super-fund Section		Weather/temperature: overcast: and mild	
Remedy Includes: (Check all that apply) <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other <u>Soil Vapor Extraction System</u> </div> <div style="width: 50%;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </div> </div>			
Attachments; <input type="checkbox"/> Inspection team roster attached* <input type="checkbox"/> Site map attached* *See Report			
II. INTERVIEWS (Check all that apply)			
1. O&M site manager <u>Brian McGee.</u> <u>Weston, Project Manager</u> <u>May 5, 2003</u> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input checked="" type="checkbox"/> by phone Phone no. (610) 70 1-3097 Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____ _____			
2. O&M staff <u>Jim Tan</u> <u>J.A. Jones, O&M Project Manager</u> <u>May 5, 2003</u> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Name Title Date </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no, (252)446-9455 Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____ _____			

Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of calk health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
 Contact _____
 Name _____ Title _____ Date _____ Phone no. _____
 Problems; suggestions; ☐ Report attached _____

Agency _____
 Contact _____
 Name _____ Title _____ Date _____ Phone no. _____
 Problems; suggestions; ☐ Report attached _____

Agency _____
 Contact _____
 Name _____ Title _____ Date _____ Phone no. _____
 Problems; suggestions; ☐ Report attached _____

Agency _____
 Contact _____
 Name _____ Title _____ Date _____ Phone no. _____
 Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Report attached.

US EPA conducted the community interviews for the site. See report.

Additional interviews were conducted for OU 1(groundwater) These findings are located in the following check list.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents <input checked="" type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
2.	Site-Specific Health and Safety Plan <input checked="" type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	O&M and OSHA Training Records Remarks _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other Permits Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	Gas Generation Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
6.	Settlement Monument Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
7.	Groundwater Monitoring Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	Daily Access/Security Logs Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A

IV. O&M COSTS																																											
1.	O & M Organization <input type="checkbox"/> State in-house <input type="checkbox"/> Contractor for State <input type="checkbox"/> PRP in-house <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Federal Facility in-house <input type="checkbox"/> Contractor for Federal Facility <input checked="" type="checkbox"/> Other <u>J.A. Jones is a subcontractor for Weston (EPA contractor.). However, operators of the system may change and Wade Lewis, the previous operator, would take over O & M.</u>																																										
2.	O&M Cost Records <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate <u>\$521,463</u> <input type="checkbox"/> Breakdown attached <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> </table>			From _____	To _____			Date	Date	Total cost	<input type="checkbox"/> Breakdown attached	From _____	To _____			Date	Date	Total cost	<input type="checkbox"/> Breakdown attached	From _____	To _____			Date	Date	Total cost	<input type="checkbox"/> Breakdown attached	From _____	To _____			Date	Date	Total cost	<input type="checkbox"/> Breakdown attached	From _____	To _____			Date	Date	Total cost	<input type="checkbox"/> Breakdown attached
From _____	To _____																																										
Date	Date	Total cost	<input type="checkbox"/> Breakdown attached																																								
From _____	To _____																																										
Date	Date	Total cost	<input type="checkbox"/> Breakdown attached																																								
From _____	To _____																																										
Date	Date	Total cost	<input type="checkbox"/> Breakdown attached																																								
From _____	To _____																																										
Date	Date	Total cost	<input type="checkbox"/> Breakdown attached																																								
From _____	To _____																																										
Date	Date	Total cost	<input type="checkbox"/> Breakdown attached																																								
3.	Unanticipated or Unusually High O&M Costs During Review Period Describe costs and reasons; _____ _____ _____ _____ _____																																										
V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A																																											
A. Fencing																																											
1.	Fencing damaged <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Gates secured <input checked="" type="checkbox"/> N/A Remarks _____ _____																																										
B. Other Access Restrictions																																											
1.	Signs and other security measures <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A Remarks _____ _____																																										

C. Institutional Controls (ICs)			
1.	Implementation and enforcement		
	Site conditions imply ICs not properly implemented	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Type of monitoring (e.g., self-reporting, drive by) _____		
	Frequency _____		
	Responsible party/agency _____		
	Contact _____		
	Name	Title	Phone no.
	Reporting is up-to-date	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Reports are verified by the lead agency	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Other problems or suggestions; <input type="checkbox"/> Report attached		

2.	Adequacy	<input type="checkbox"/> ICs are adequate	<input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
	Remarks _____		

D. General			
1.	Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
	Remarks _____		

2.	Land use changes on site	<input checked="" type="checkbox"/> N/A	
	Remarks _____		

3.	Land use changes off site	<input checked="" type="checkbox"/> N/A	
	Remarks _____		

VT. GENERAL SITE CONDITIONS			
A. Roads	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1.	Roads damaged	<input checked="" type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
	Remarks <u>See report</u>		

B. Other Site Conditions			
Remarks _____			
VII. LANDFILL COVERS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
A. Landfill Surface			
1.	Settlement (Low spots) Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Cracking not evident
3.	Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
4.	Holes Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Holes not evident
5.	Vegetative Cover <input type="checkbox"/> Grass <input type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____		
6.	Alternative Cover (armored rock, concrete, etc.)		<input type="checkbox"/> N/A
7.	Bulges Areal extent _____ Height _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Bulges not evident
8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas/wafer damage not evident <input type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____		

9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
Areal extent_____				
Remarks_____				
<hr/>				
B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks_____				
<hr/>				
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks_____				
<hr/>				
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
Remarks_____				
<hr/>				
C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement	
Areal extent_____ Depth_____				
Remarks_____				
<hr/>				
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation	
Material type_____ Areal extent_____				
Remarks_____				
<hr/>				
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion	
Areal extent_____ Depth_____				
Remarks_____				
<hr/>				
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting	
Areal extent_____ Depth_____				
Remarks_____				
<hr/>				
5.	Obstructions	Type_____	<input type="checkbox"/> No obstructions	
<input type="checkbox"/> Location shown on site map Areal extent_____				
Size_____				
Remarks_____				
<hr/>				

6.	Excessive Vegetative Growth <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Remarks _____ _____	Type _____ Areal extent _____
D. Cover Penetrations <input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Gas Vents <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____	
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____	
3.	Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____	
4.	Leachate Extraction Wells <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____	
5.	Settlement Monuments <input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks _____ _____	

E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Gas Treatment Facilities <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
2.	Gas Collection Wells, Manifolds and Piping <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Gas Monitoring Facilities (<i>e.g.</i> , as monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Outlet Pipes Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
2.	Outlet Rock Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation Areal extent _____ Depth _____ <input type="checkbox"/> N/A <input type="checkbox"/> Siltation not evident Remarks _____ _____		
2.	Erosion Areal extent _____ Depth _____ <input type="checkbox"/> Erosion not evident Remarks _____ _____		
3.	Outlet Works <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		
4.	Dam <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____ _____		

H. Retaining Walls		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Remarks _____		
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
4.	Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Performance Monitoring	Type of monitoring _____	
	<input type="checkbox"/> Performance not monitored		
	Frequency _____	<input type="checkbox"/> Evidence of breaching	
	Head differential _____		
	Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input type="checkbox"/> NA
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> NA Remarks _____ _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____ _____		

C. Treatment System			
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good Condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp, roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____		
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
D. Monitoring Data			
1.	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining in some wells		

D. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
X. OTHER REMEDIES			
SOIL REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> NA			
A. Soil Vapor Extraction <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> NA			
1.	Pumps, Wellhead Plumbing, and Electrical <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> NA Remarks _____ <u>SVE system</u> _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____		

C. Treatment System		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input checked="" type="checkbox"/> Others <u>Mini-cyclone</u> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good Condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
5.	Treatment Building(s) <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp, roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____		
6.	Monitoring Wells (pump and treatment remedy) <input checked="" type="checkbox"/> secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
D. Monitoring Data			
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining in some wells		

XI. OVERALL OBSERVATIONS	
A.	Implementation of the Remedy
	<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p>See text of five-year report</p>
B.	Adequacy of O&M
	<p>Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p>See text of five-year report</p>
C.	Early Indicators of Potential Remedy Problems
	<p>Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future</p> <p>See text of five-year report</p>
D.	Opportunities for Optimization
	<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy</p> <p>See text of five-year report</p>

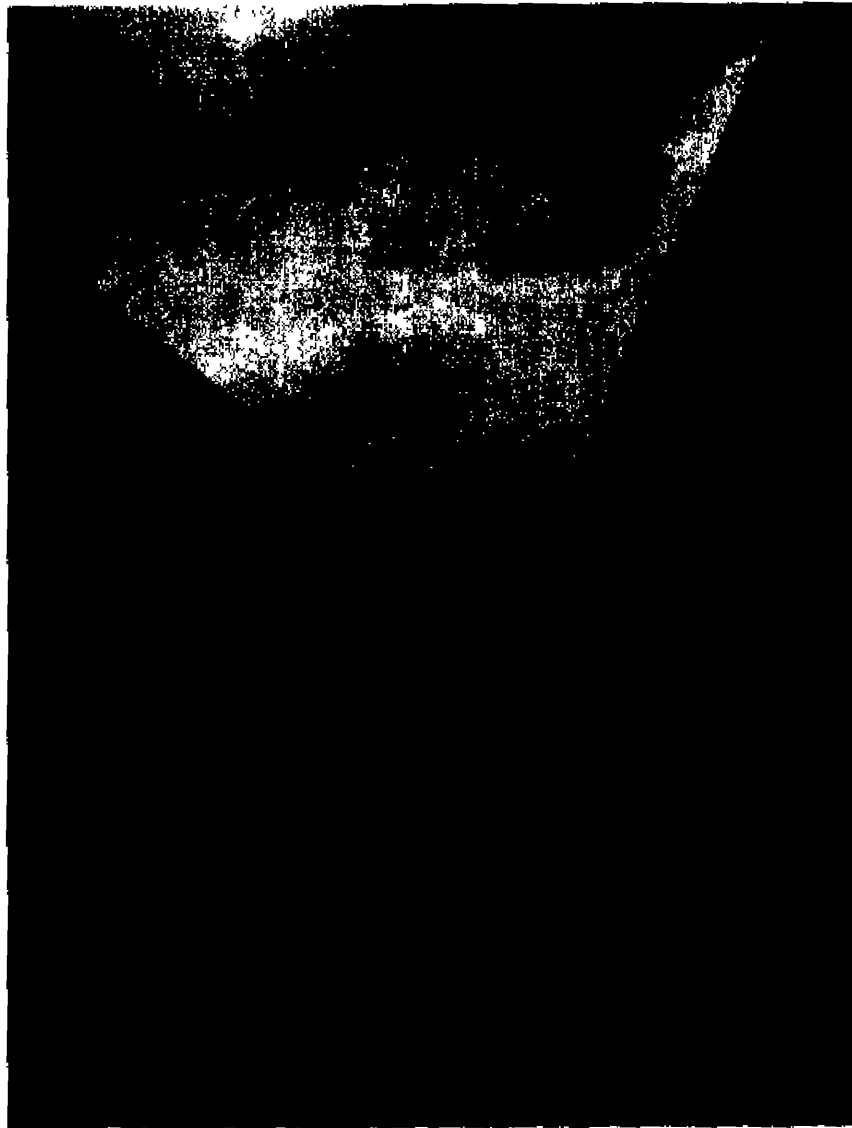
ATTACHMENT 3



Entrance to the ABC One Hour Cleaners operation.



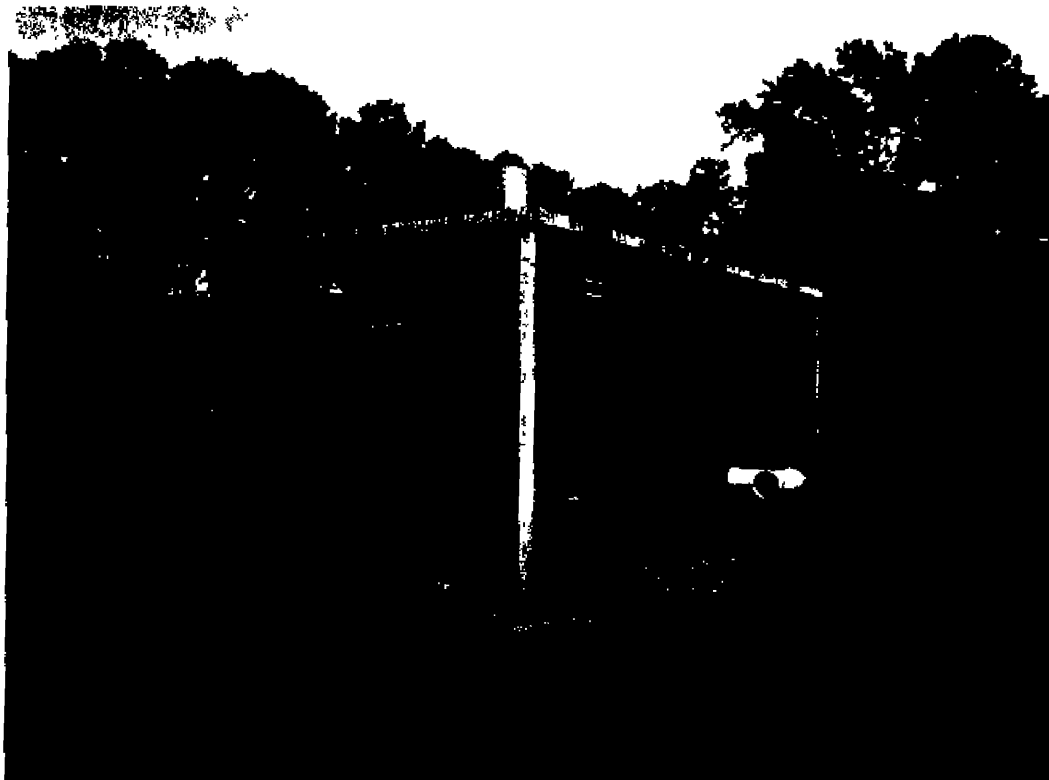
A side view of the building.



Side of the ABC One Hour Cleaner building. This is the location of the well and entrance to the SVE system.



Sign for the Tamara Terrace Housing Development .



Groundwater Extraction and Treatment System housing unit.



Side view of the groundwater treatment building, a drum and the air stripper tray are visible.



Another view of the groundwater treatment building, the wood pallets are stored behind the building.

ATTACHMENT 4

5-Year Review Questionnaire

Site ABC Gro Home Business
City/State Jacksonville, NC 28576

Date: May 30, 2003 Phone No. (919) 353-3132

Name of Citizen Mr. Major Midgott

Address Major Furniture Co.

2127 Lejeune Blvd, Jacksonville

Do you live near the Site? If yes, how long? Own business next to site

Are you familiar with EPA activities over the past years? yes

✓ What is your overall impression of the project? When they first started activities there they pumped out something that put in initial drums. The drums were left there over a year and they leaked. So, at first not impressed.

✓ Overall, have you been pleased or displeased with cleanup actions at this Site? Heavily displeased. Time taken was except that the government is spending so much money to clean up the property and water.

✓ What effects, if any, have site operations had on the surrounding community? None that he is aware of.

✓ Do you still have any concerns regarding EPA clean up activities of the Site? Yes - what is the condition of groundwater? Is it getting cleaner? He used to well water until 1999. Then city water put in. The well was used to sample groundwater.

✓ Do you think you have been kept adequately informed about clean up activities at the Site? No - only contacted when his property was sampled.

✓ Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details. No

Is there someone else that you would like to recommend we contact for more information?

No

Do you have any suggestions that EPA can implement to improve communication with the public?

Yes - anytime there is a problem with land surrounding the Site people should be told - he said he was worried if his land was contaminated or not.

Interview conducted by: Liane Bennett

Date conducted: May 30, 2003

5-Year Review Questionnaire for Govt. Officials

Site ABC One-Stop Cleaners
City/State Jacksonville, NC

Date: May 20, 2003 Phone No. (910) 455-0354

Name Jerry Bittern, Mayor Pro Tem

Address Jacksonville, NC

✓ What is your overall impression of the project? Lengthy & drawn out & misunderstood by the general public

✓ Have there been routine communications or activities conducted by your office regarding the Site? (Site visits, inspections, reporting activities, etc.) If so, please give purpose and results.

No

✓ Have there been any complaints, violations or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results.

Not that he is aware of.

✓ Do you feel well informed about the Site's activities and progress? Nothing lately

✓ Do you think clean up activities at the Site have had a positive or negative impact on the community? In what ways?

Generally speaking from something being done to clean up contamination, a good impact.

✓ Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

More public disclosure of results of clean up, need to provide more information about what is happening.

Interview conducted by Bruce Barnett

Date conducted May 20, 2003

5-Year Review Questionnaire for Govt. Officials

Site

City/State

Date: 5/20/03

Phone No. (910) 938-5200

Name

Address

✓ What is your overall impression of the project?

Good job of identifying problems and taking action.

✓ Have there been routine communications or activities conducted by your office regarding the Site? (Site visits, inspections, reporting activities, etc.) If so, please give purpose and results.

None - depending upon authority to handle.

✓ Have there been any complaints, violations or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results.

None

✓ Do you feel well informed about the Site's activities and progress?

Yes, absolutely

✓ Do you think clean up activities at the Site have had a positive or negative impact on the community? In what ways?

Hard to gauge - positive in that drinking water is being addressed

✓ Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

None

Interview conducted by

Date conducted

Debra Bawit

May 30, 2003

5-Year Review Questionnaire for Govt. Officials

Site ABC Dry-Flow Cleaner
City/State Jacksonville, N.C.
Date: May 30, 2003 Phone No. (910) 347-2154
Name John Harrison, Supervisor
Address Asheville Environmental Health Dept.
Jacksonville, N.C.

What is your overall impression of the project? Has not had any involvement
with project & is not familiar with clean up operations.
Does know there has been groundwater contamination from site that
has impacted residential well across Highway 101.
Have there been routine communications or activities conducted by your office regarding the Site?
(Site visits, inspections, reporting activities, etc.) If so, please give purpose and results.

Have there been any complaints, violations or other incidents related to the Site requiring a response
by your office? If so, please give details of the events and results.

Do you feel well informed about the Site's activities and progress?

Do you think clean up activities at the Site have had a positive or negative impact on the community?
In what ways?

Do you have any comments, suggestions, or recommendations regarding the Site's management or
operation?

Interview conducted by Deane Barrett

Date conducted June 3, 2003